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JOURNAL OF EDUCATIONAL RESEARCH

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JOURNAL *of* EDUCATIONAL RESEARCH

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TESTING THINKING

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INTRODUCTION

IN the discussion that is to follow it is assumed that the development of thought power is one of the major aims of all education. A person has thought power when he can think independently, creatively, reflectively. It is further assumed that thought power is something that can be taught rather than the result of magic or entirely a product of heredity. It seems certain that genuine thinking can arise only from a fund of facts, meanings and experiences. It is clear also that an acquaintance with the thoughts of great thinkers tends to stimulate creative thinking on the part of the pupil.

Having thus subscribed to a general point of view it is now possible to raise the question of what need there is in the teaching of thinking for the appraisal of results. Undoubtedly there is a demand for the measurement of the end product, creative thinking. But there is also equal need for the measurement of a pupil's knowledge of relevant facts and meanings and of his acquaintance with the thought of our great thinkers. These distinctions have been far from clear in the great testing movement that has just swept over us. Our standard tests, even the best of them, forget that relevant facts are the only ones that function in the development of thought power. Furthermore, the reality of the relevancy must be perceived by the pupil. Teachers waste much time in asking isolated fact questions of pupils. Widely acclaimed tests and batteries of tests are composed very largely of a hodge-podge of uncorrelated facts. In both cases the pupil fails to see the relevancy of the facts to each other or to thinking. Usually there is no such relevancy. Even at their best standard tests in general are not noted for their validity as measures of the pupil's power to master the thought of others. As a means of appraisal for creative thinking these tests are certainly most inadequate.

The final net result reduces itself to this: We have no adequate means of measuring a pupil's progress toward the art of thinking for himself. For this sort of thing our commercial tests, as a rule, simply are not valid.

THE PLAN OF THE STUDY

The purpose of the study which is now to be described was to seek a remedy for the situation which has just been considered. The search led back to the essay examination. It was at once evident that the aim of essay questions in many cases was to appraise the pupil's mastery of the thought as contained in his text or reference book. Almost everyone knows the story of what happened to the essay-examination technique. It was shown to be unreliable[1] and was replaced almost entirely by standard tests and the so-called new form examinations. The result was a marked improvement in reliability but a decrease in validity so far as the appraisal of thought power is concerned. Nevertheless, during the last decade almost every writer on the subject of tests and measurements has taken it upon himself to condemn the essay examination.[2]

The present study shows how a marked increase in reliability can be obtained by a plan other than the one used by Odell.[3] Each of three sets of old-fashioned essay examinations were assigned to a pupil for answers. The first set relates to elementary United States history. The questions are those used most widely in the United States as obtained by a survey made in 1925.[4] The second and third sets relate to secondary United

---

[1] Starch, D., and Elliott, E. C. "Reliability of the Grading of High School Work in English," *School Review*, XX, pp. 442-457.

"Reliability of Grading Work in Mathematics," *School Review*, XXI, pp. 245-259; 678-681.

[2] For notable exceptions see:

Monroe, W. S., and Streitz, Ruth. *Directing Learning in the High School* (Garden City, New York: Doubleday, Doran and Company, 1927), pp. 507-514.

Odell, C. W. *Traditional Examinations and New Type Tests.* New York: The Century Company, 1928.

Sims, V. M. "The Objectivity, Reliability and Validity of an Essay Examination by Rating," *Journal of Educational Research*, XXIV (October, 1931), pp. 216-223.

Sims, V. M. "Essay Examinations Classified on the Basis of Objectivity," *School and Society*, XXXV, pp. 100-102.

[3] Odell, C. W. *Scales for Rating Pupil's Answers to Nine Types of Thought Questions in General Science.* University of Illinois Bulletin. Urbana, Illinois: Bureau of Educational Research, University of Illinois, 1927.

[4] Osburn, W. J. *Are We Making Good at Teaching History?* Bloomington, Illinois: Public School Publishing Company, 1927.

States history and biology, respectively. They were obtained from a textbook on standard tests in secondary education in which they were quoted with disapproval.[5] The pupil's paper on each set of questions was mimeographed, including all errors as far as possible, and assigned to groups of experienced teachers and principals for grading by the percent method. The results were as unreliable as ever. One teacher assigned to the paper in elementary United States history a percent grade of 25 while another teacher thought the paper was worth 85. For the secondary school papers the grades were equally unreliable. When the results of the percent grading were posted all of the graders were convinced that essay questions in their original form are too unreliable for any intelligent use.

IMPROVING THE ESSAY EXAMINATION

With the foregoing motivation the graders were ready to undertake measures for improvement. The first step toward securing better results consisted in asking each grader to write out what he considered to be a one hundred percent paper for pupils of the corresponding grade levels. When the one hundred percent papers were collected no doubt was left concerning one cause of the unreliability. Most of the graders were using different standards for their grading. The resulting grades were inevitably unreliable. Obviously the essay examination is almost valueless unless a scoring key is provided for use in grading.

The second step in the process of improvement, therefore, was the construction of a scoring key. In order to describe this process it is necessary to consider the nature of the questions.

QUESTIONS IN ELEMENTARY UNITED STATES HISTORY

1. Compare the Articles of Confederation and the Constitution.
2. What was the New England Confederation?
3. Describe the Indians.
4. Discuss the Louisiana Purchase.
5. Explain "Taxation without Representation."
6. Give the effect of the Erie Canal.
7. How did the French and Indian War prepare for the Revolution?
8. State the contents of the Nineteenth Amendment.
9. What was the effect of the cotton gin on slavery?
10. Why did the South favor a low tariff?
11. Write about the Lewis and Clark Expedition.

The questions in secondary American history and biology were quite similar in type. Owing to the limitations of space the technique for

[5] Symonds, P. M. *Measurement in Secondary Education* (New York: Macmillan Company, 1928), p. 3.

constructing a scoring key will be described for elementary history only. The first question in the list is "Compare the Articles of Confederation with the Constitution." In his one hundred percent paper each grader selected the bases for this comparison, but different graders used different bases. The total number of such bases appearing on all papers was twenty-two. These were assembled and used as a scoring key for question one. A similar procedure was used with each question on all three lists.

An inspection of the one hundred percent papers showed that special difficulty was involved in the grading of several of the questions. The cause of the difficulty was the vagueness of meaning of the questions as stated. For example, in question four what does "Discuss" mean? What is the meaning of "Explain" in question five? In questions six and nine is *just one* effect wanted or is it the total effect? What sort of an answer is the child expected to give to question eleven?

In the face of these difficulties the only possible procedure was to assign arbitrary meanings to these questions. For questions four and five an unabridged dictionary was consulted, and the most convenient definition was used. "Discuss" was interpreted as meaning to "tell the advantages and disadvantages." With reference to the Louisiana Purchase *these* were applied both to the United States and France and treated from the standpoint of conditions in 1803. "Explain" was interpreted as meaning to "give an illustration." In questions six and nine it was assumed that all of the important effects were desired. In connection with question eleven it was finally decided that a combination of all the one hundred percent answers would be most satisfactory.

SCORING PROCEDURE

With the foregoing interpretations it was possible to make out a scoring key. This procedure may be illustrated in connection with the question "Compare the Articles of Confederation and the Constitution." Obviously a good scoring key is one that shows all of the correct answer and excludes all elements that are incorrect. The problem in hand, therefore, was to list all possible elements which contribute to a complete and correct answer to this question. These elements were obtained by consulting all available textbooks. Twenty-two such elements were found, each of which appears in some published textbook. Of course, there may be more, but, surely, credit should be assigned to each pupil who mentions any of these elements in his answer to the question. The ele-

ments in the scoring key for each of the remaining ten questions were obtained in a similar manner. A complete copy of the scoring key follows:

THE SCORING KEY

(Maximum Score, 132 points)

I. Compare (A) the articles of Confederation and (B) the Constitution. (22 points)

1. Under A, Congress had one chamber.
   Under B, Congress had two chambers.
2. A did not provide for a centralized government.
   B did so provide.
3. A provided for voting by States in Congress.
   B provided for voting by individuals.
4. A did not provide for a Federal Judiciary.
   B did so provide.
5. Both provided for the raising of revenue.
6. A provided for the assessment of revenue by states.
   B provided for a general revenue.
7. A permitted states to pass tariff laws.
   B did not.
8. A did not provide for uniform currency.
   B did so provide.
9. Both enumerated the powers of the Federal Government.
10. Both provided for the declaration of war.
11. A could not enforce military service.
    B could do so.
12. A did not provide for an executive department.
    B did so provide.
13. A did not guarantee the payment of national debts.
    B did so provide.
14. Both permitted Congress to borrow money.
15. A did not provide for the enforcement of laws.
    B did so provide.
16. A did not provide a means of taxation.
    B did so provide.
17. Both were attempts at federal government.
18. A required unanimous consent to amendments.
    B did not so provide.
19. A did not provide direct representation.
    B did so provide.
20. A provided for interstate commerce.
    B did not so provide.
21. A did not make heads of departments responsible to the President.
    B did make such requirement.
22. Both had a department of foreign affairs.

II. What was the New England Confederation? (4 points)

1. A union of New England colonies for
2. Offense
3. Defense
4. Mutual welfare

III. Describe the Indians. (14 points)

1. Personal appearance
2. Physical characteristics
3. Mental attitude
4. Habits of life
5. Type of home
6. Origin
7. Religion
8. Tribal relations

9. Means of livelihood
10. Stage in civilization
11. Weapons and tools
12. Language
13. Means of travel
14. Means of Communication

IV. Discuss the Louisiana Purchase. (24 points)

(a) Advantages:

1. It doubled the area of the United States.
2. It gave us valuable land.
3. It gave the West a free outlet for commerce with the world.
4. It prevented France from establishing an empire in the West.
5. It prevented possible war with France.
6. It strengthened the friendship between England and the United States.
7. It prevented England's designs of occupations.
8. It strengthened the national government.
9. It defeated Aaron Burr's treasonable designs.
10. It made a united country.
11. It gave us cheap land.
12. It encouraged settlement in the West.
13. France needed the money.
14. France needed defense elsewhere.
15. France was relieved of the difficulty of defending Louisiana.

(b) Disadvantages:

1. It was said to be unconstitutional.
2. It was considered too expensive.
3. It was thought that the land would never be needed.
4. It was argued that so large a country could not be governed by the United States.
5. It was said the territory was not worth the price.
6. It was thought that the purchase would endanger the influence of New England.
7. It was said that France had no right to make the sale.
8. It was feared that the purchase would be the cause of boundary disputes.
9. It was claimed that the purchase constituted a return to State sovereignty.

V. Explain Taxation without Representation. (2 points)

1. The colonies were compelled to pay a tax to England.
2. The colonies were not represented in the English Parliament.

VI. Give the effect of the Erie Canal. (21 points)

1. It decreased transportation charges.
2. It created a better market in New York City.
3. It caused cities to grow up beside it.
4. It made New York our largest city.
5. It increased the price of land in the West.
6. It lessened the price of farm implements in the West.
7. It made European markets and goods available for the West.
8. It decreased the cost of western products in the East.
9. It stimulated the business of the entire country.
10. It united the East and the West.
11. It improved communication.
12. It speeded up transportation.
13. It stimulated the development of the interior of the continent.
14. It decreased the cost of travel.
15. It lowered the cost of living.
16. It stimulated production.
17. It promoted an increase of population.

18. It stimulated other canal projects.
19. It caused the waste of much money in the construction of other canals.
20. It encouraged immigration from Europe.
21. It caused people to be killed by the Indians.

VII. How did the French and Indian war prepare for the Revolution? (9 points)
1. It trained leaders.
2. It trained soldiers for a new type of warfare.
3. It gave confidence to the colonists.
4. It promoted the idea of independence.
5. It increased taxes in the colonies.
6. It promoted the idea of union for a common defense.
7. It made the protection of England seem less necessary.
8. It trained the colonial Congress in preparation for war.
9. It centered opposition against England rather than France.

VIII. State the contents of the Nineteenth Amendment. (2 points)
1. The Amendment gave the rights of suffrage to women as well as men.
2. It gave Congress the power of enforcement.

IX. What was the effect of the cotton gin on slavery? (10 points)
1. It increased the rate of cleaning cotton.
2. It stimulated the planting of cotton.
3. It created a demand for cheap labor.
4. It increased the demand for cotton.
5. It increased the demand for slaves.
6. It caused slavery to become more deeply rooted in the South.
7. It led indirectly to the Civil war.
8. It facilitated the spread of slavery westward.
9. It motivated the smuggling of slaves.
10. It led to the purchase of slaves from the northern states.

X. Why did the South favor a low tariff? (9 points)
1. The South became the producer of raw materials.
2. The South became the consumer of articles manufactured elsewhere.
3. The South felt that the protective tariff benefited the manufacturer rather than the producer.
4. The South desired freedom of trade with Europe.
5. The South objected to government favor for one form of industry over another.
6. The protective tariff increased the cost of what the South consumed.
7. The tariff would offend England, the South's best customer.
8. The development of manufacturing in the South was impossible.
9. It increased the cost of clothing for slaves.

XI. Write about the Lewis and Clark Expedition. (15 points)
1. It proposed to explore the Louisiana Territory.
2. It proposed to study the resources of the region.
3. It proposed to make maps of the region.
4. It proposed to study the Indian tribes.
5. It aimed to develop the fur trade with the Indians.
6. It aimed to study the Geology, Botany and Zoology of the region.
7. It gave an idea of the size, extent and resources of the Louisiana Territory.
8. It increased interest in the settlement of the West.
9. It promoted westward migration.
10. It stimulated further exploration of the territory.
11. It gave the United States a stronger claim to the Oregon country.
12. The leader and number of members.
13. The date of the start and time required for the completion of the expedition.
14. How the expedition was made.
15. Where the expedition went.

WEIGHTING THE QUESTIONS

In the foregoing scoring key totals are given for each question. These totals yield a grand total of 132 points. As has been previously noted there may be more correct answers but clearly there are at least this many. In the final grading of the paper each of the 132 statements which was correctly mentioned contributed one point to the total score. Since a complete answer to question one calls for twenty-two elements a perfect score for this question is 22. No credit was given unless both statements in any of the twenty-two elements were correct. It will be noticed that some of the twenty-two elements are more important than others. Thus item two includes many of the others. In the present study, however, every item was credited with one point for the sake of simplicity of procedure in scoring.

The resulting totals for each question constitute a weighting for that particular question. Thus question one with a total of 22 points becomes eleven times as important as question five with a total of only two points. This may seem objectionable to some but it is at least a consistent weighting scheme. Further research will no doubt show a number of improvements in this entire technique.

When the scoring key was finished one more item remained to be considered. This was the vexed question of how much to take off for errors in spelling, handwriting and errors in English form. The question was put to vote and the median amount voted by the graders was 5 percent. It was understood that not more than 5 percent of a pupil's grade could be deducted for errors in form.

TABLE I

DISTRIBUTION OF PERCENT GRADES ASSIGNED TO A PUPIL'S PAPER IN ELEMENTARY UNITED STATES HISTORY WITHOUT AND WITH A SCORING KEY

Scores	Without Scoring Key	With Scoring Key
85-89	1	0
80-84	3	0
75-79	1	0
70-74	7	0
65-69	10	2
60-64	8	0
55-59	5	0
50-54	2	0
45-49	6	4
40-44	3	9
35-39	2	6
30-34	1	8
25-29	1	6
20-24	0	1
N	50	36
Median	62.6	36.7
Q	8.8	6.2
Range	25-85	24-66

The graders then proceeded to regrade the pupils' papers in the light of the previous study. Table I shows the results of the first and second scoring.

The data in Table I show a marked increase in reliability when the Scoring Key is used. The quartile deviation with the scoring key was 6.2 percent and the range was 42 percent. If two graders had not admittedly ignored the scoring key these figures would have been 4.5 percent for the quartile deviation and 21 percent for the range. The two graders in question each gave a grade of 65 percent with the scoring key which was 20 percent more than any one else gave. They justified their action on the ground that the pupil who wrote the paper did not have sufficient help in interpreting the meaning of the questions.

TABLE II

DISTRIBUTION OF SCORES BY QUESTIONS IN AN ELEMENTARY HISTORY EXAMINATION

Scores	Questions										
	1	2	3	4	5	6	7	8	9	10	11
11.0-11.9	1	0	1	0	0	0	0	0	0	0	0
10.0-10.9	1	0	2	0	0	0	0	0	0	0	0
9.0- 9.9	1	0	3	0	0	0	0	0	0	1	0
8.0- 8.9	1	0	3	3	0	0	0	0	0	0	0
7.0- 7.9	7	0	12	2	0	2	1	0	1	0	1
6.0- 6.9	7	0	7	7	0	1	1	0	10	1	2
5.0- 5.9	6	2	2	3	0	4	1	0	9	2	5
4.0- 4.9	2	4	1	4	0	5	12	0	5	6	6
3.0- 3.9	4	8	1	1	0	9	9	0	6	8	12
2.0- 2.9	2	10	0	4	10	7	8	5	2	12	5
1.0- 1.9	1	8	0	2	23	5	1	28	0	2	2
0.0- 0.9	0	1	1	7	0	0	0	0	0	1	0
N	33	33	33	33	33	33	33	33	33	33	33
Median	6.2	2.8	7.4	4.9	1.7	3.5	3.6	1.6	5.4	3.2	3.8
Q	1.4	0.9	0.9	2.4	0.45	1.1	0.7	0.3	1.2	1.0	0.9

An inspection of the last two lines of Table II shows that the medians for five of the eleven questions are at least four times their quartile deviations. These conditions meet the conventional requirements for satisfactory statistical reliability. The other six medians fall more or less short. In secondary United States history six out of eight medians meet the required statistical standards of reliability while in biology the corresponding number of questions reliably graded was seven out of ten. These results prove definitely that the reliability of the essay examination can be improved. In this connection it must be remembered that the pupil who wrote the paper had no assistance in interpreting the questions and no help in determining the breadth of answer required. When these defects are taken care of there is every reason to hope that essay examinations may be brought up to standard requirements for reliability.

IMPLICATIONS OF THE STUDY

An outstanding result of the study was the conviction that essay examinations are susceptible to marked improvement. They have been greatly neglected with the result that our ignorance of their possibilities is profound. The contents of the one hundred percent papers show conclusively that even experienced principals and teachers as a group have almost no knowledge of what one may reasonably expect from pupils in their answers to essay questions. Without such a standard good teaching is out of the question. Many examination questions are framed so poorly that pupils can achieve success only because they are good guessers at what the teacher really wants. As a rule, teachers seem satisfied if their questions call up anything at all of what the pupil has learned.

The results of the study raise several important questions which are well worth further study. We have no definite information concerning when we should supply a thought pattern to the pupil and when we should not. Consider question one for example. The comparison can be made on at least twenty-two different bases. Have we a right to expect elementary pupils to supply these bases or should we expect that only in college? Would it be fairer in the elementary school to use the form "Compare the Articles of Confederation and the Constitution with reference to (a) centralization of government, (b) provisions for taxation and so on?" If so, how many of the twenty-two elements should we include? To what extent should the thought patterns be supplied with other questions? Should we furnish a thought pattern with "Describe the Indians?" What help, of this sort, if any, is needed with "Write about the Lewis and Clark Expedition?"

Should not every teacher take pains to see that her questions are clear? Has any teacher a right to ask pupils to discuss or explain when they and even she have no clear idea of what these words really mean? Can pupils experience a square deal when the questions are vague or is there a certain justice in the child's accusation that the "teacher has it in for him?" To what extent and under what conditions has the teacher a right to ask questions which are of unequal value? According to the scoring key the value of these eleven questions varies from two to twenty-four. Has the pupil a right to know this beforehand? What shall we say of a teacher who does not know it? Should not provisions be made in all examinations to control the teachers (and there are a number of them) who inflict unmerciful penalties for errors in handwriting, spelling, and errors in English form?

The mere mention of some of these questions suggests the answer. Others require further research for solution. When all of the answers are at hand the essay examination will be able to meet all standard requirements as to reliability and will lose nothing of its traditional reputation as a valid measure of thought mastery.[6]

[6] Copies of improved essay examinations in history and geography may be obtained from the Stoneman Press, Columbus, Ohio.

THE ENGLISH HANDICAP OF JUNIOR HIGH-SCHOOL PUPILS FROM FOREIGN SPEAKING HOMES, AND REMEDIAL SUGGESTIONS

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PURPOSE OF THIS STUDY

IN sections of the United States where pupils from foreign speaking homes make up a high percentage of the school enrollment, the teaching of English to the foreign pupil has been a perplexing problem. Both the written and oral composition of such pupils contains errors which are seldom made by other than the foreign speaking pupils. Examples of such errors are misspelling words because they mispronounce them (*dat* for *that*, *dey* for *they*, *latter* for *ladder*, etc.), confusing words of similar sound and meaning, and confusing our most common language expressions.

Although this apparent handicap persists, educators have made few moves to determine the extent of the handicap, the elements of English in which it is most pronounced, or what might be done to lessen it.

This study attempts two things:

I. To determine whether junior high-school pupils from foreign speaking homes are actually handicapped in English.
II. If a handicap exists, to determine its extent, with the elements of English in which the foreign pupils are especially handicapped, and to suggest plans for remedial teaching.

MEASURES USED

To obtain the necessary data for this study three standardized tests were given to 201 junior high-school pupils of Arma, Kansas: The Otis Self-Administering Test of Mental Ability, Form A; the New Stanford Achievement Test, Form V; and the Sim's Socio-Economic Score Card, Form C. Of the 201 pupils, 52 were in grade seven, 72 in grade eight, and 77 in grade nine.

The Otis Self-Administering Test was used to measure mental ability; the New Stanford Achievement Test measured school achievement; and the Sim's Score Card measured the pupil's home conditions. Of the ten

tests in the New Stanford Achievement Test, the scores on five—Paragraph Meaning, Word Meaning, Dictation, Language Usage, and Literature—were used as measures of English achievement. The other five tests, History and Civics, Geography, Physiology and Hygiene, Arithmetic Reasoning, and Arithmetic Computation, were used as measures of school achievement other than English.

CLASSIFICATION INTO GROUPS

A series of questions was mimeographed on the back of the Sim's Score Card. Three of these asked the pupil to designate the language usually spoken in the home, (1) by the father, (2) by the mother, and (3) by himself; and a fourth to answer "yes" or "no" to the question: "Is English the only language spoken in your home?" Using these answers the pupils were divided into three groups:

1. Only English Speaking.
2. English-Foreign Speaking.
3. Usually Foreign Speaking.

All of the 201 pupils were placed into one of the two major groups: the "Only English Speaking" comprising the 97 pupils who answered "yes" to the question: "Is English the only language spoken in your home?" and the "English-Foreign Speaking," comprising the 104 pupils who answered "no" to the same question. The 34 pupils from the "English-Foreign Speaking" group who answered that a foreign language was usually spoken in their home by the father, mother, and themselves were designated as the "Usually Foreign Speaking" group.

This article compares the achievement of groups 1 and 3 only, since one might expect the greatest differences between these two groups in English achievement. The "Only English Speaking" group will hereafter be called the "English" group, and the "Usually Foreign Speaking" will be called the "Foreign" group.

1. ARE THE FOREIGN PUPILS HANDICAPPED IN ENGLISH?

In order to answer this question the scores made on the English sections of the New Stanford Achievement Test by the Foreign group will be compared with those made by the English group. The first comparison will make use of the total groups; the second will use matched pairs.

1. Mean Achievement Scores Made by the English and Foreign Groups.—If we should find the mean scores made by the Foreign pupils in a school grade are lower than those made by the English pupils in the

same grade, these lower scores would indicate a probable handicap of some kind for the Foreign pupils. Table I gives the mean scores on each of the ten sections of the New Stanford Achievement Test for the two groups in each grade. It also gives the difference in the means for the two groups in each grade. It is read in this manner: on the first section of the test, Paragraph Meaning, the mean score of the 19 English pupils in grade seven is 77.5; the mean score for the 13 Foreign pupils is 75.5; the difference in these mean scores is 2. A positive difference indicates that the mean of the English group is the larger. In grades 8 and 9 there is no section of the test in which the mean of the Foreign pupils is the larger; in the seventh grade this happens in three of the twelve sections. This shows that the Foreign pupils do not achieve as much as their English classmates, and therefore must suffer from a handicap of some kind.

TABLE I

COMPARISONS BETWEEN THE MEAN SCORES MADE BY 97 "ONLY ENGLISH SPEAKING" AND 34 "USUALLY FOREIGN SPEAKING" PUPILS ON THE NEW STANFORD ACHIEVEMENT TEST

	Grade VII			Grade VIII			Grade IX		
Section of Test	Eng. (19)	For. (13)	Diff.*	Eng. (40)	For. (10)	Diff.*	Eng. (28)	For. (11)	Diff.*
English:									
Paragraph Meaning	77.5	75.5	2.0	95.1	81.5	13.6	102.2	90.2	12.0
Word Meaning	73.1	71.6	1.5	86.9	73.0	13.9	94.5	83.4	11.1
Dictation	82.5	78.1	4.4	91.2	83.0	8.2	101.3	92.9	8.4
Lang. Usage	69.9	52.8	17.1	90.1	71.5	18.6	96.6	77.9	18.7
Literature	56.0	66.3	−10.3	72.1	55.5	16.6	82.9	78.4	4.5
Sum†			15.7			70.9			54.7
Non-English:									
History and Civics	71.2	74.3	− 3.1	91.8	81.5	10.3	99.0	96.7	2.3
Geography	78.6	77.8	.8	89.4	85.5	3.9	95.6	87.0	8.6
Phys. and Hygiene	81.7	82.4	− .7	99.9	89.0	10.9	103.2	92.0	11.2
Arith. Reasoning	81.2	71.6	9.6	87.4	74.5	12.9	96.5	87.0	9.5
Arith. Comp.	85.2	77.0	8.2	92.6	83.0	9.6	105.6	94.8	10.8
Sum†			14.8			47.6			42.4
Difference between sums‡			.9			23.3			12.3

* "Diff."—the mean score made by the "Foreign" pupils on each test subtracted from the mean score made by the "English" pupils on the same test. Positive differences indicate a superiority of the "English" pupils; negative differences, a superiority of the "Foreign" pupils.

† "Sum"—these are algebraic sums of the column of differences.

‡ "Differences between sums"—the sum of the differences on the non-English tests (14.8) subtracted from the sum of the differences on the English tests (15.7).

We may now ask what sections of the test show the greatest difference in the achievement of the two groups. If the five sections that deal with English achievement show greater differences than the five non-English sections, this would appear to be partial evidence that the handicap is greater in English than in other phases of school work. Since the New Stanford Achievement Test has been constructed in such a way that a given score (say 80) represents the same level of achievement on each

of the ten sections of the test, we can get evidence to apply to our question by adding the differences in mean scores on the five English sections and calling their sum the total handicap of the Foreign pupils in English. Likewise the sum of the differences in mean scores on the five non-English sections can be called the total handicap of the Foreign pupils in other school achievement. Table I shows these sums for each of the three grades. On the English sections the sums are 15.7, 70.9 and 54.7 for grades 7, 8, and 9, respectively; on the non-English sections the sums are 14.8, 47.6, and 42.4. If we compare the total handicap in English with the total handicap in non-English achievement, we can determine which handicap is the larger. The table also shows that the differences between these sums are .9, 23.3, and 12.3 in the respective grades, with the English handicap consistently the larger. This evidence seems to show that the Foreign pupils are handicapped in English more than in other phases of school work.

The Foreign pupils may achieve less than the English pupils because the former are younger, or are of inferior mental ability, or come from poorer homes. Could this difference in achievement be due to differences in age, mental ability, or home environment? Table II gives certain measures of the two groups in these characteristics. It is read as follows: in grade seven the mean chronological age of the English pupils is 12 years, 6 months; of the Foreign pupils, 12 years, 10 months; which is a difference of 4 months. Likewise, in grade eight the mean Otis scores are 44 and 27.5 for the English and Foreign groups, respectively, with a difference of 16.5.

TABLE II

COMPARISON OF THE ENGLISH AND FOREIGN PUPILS IN CHRONOLOGICAL AGE, MENTAL ABILITY (OTIS SCORE), AND HOME ENVIRONMENT (SIMS SCORE)

Grade	Mean Chron. Age			Mean Otis Score			Mean Sim's Score		
	Eng.	For.	Diff.	Eng.	For.	Diff.	Eng.	For.	Diff.
7	12- 6	12-10	-0-4	30.24	28.15	2.09	9.41	8.23	1.18
8	13- 6	14	-0-7	44	27.5	16.5	12.1	7.4	4.7
9	13-10	15- 1	-1-3	52.13	40.18	11.95	13.95	10.82	3.13

Comparative Ages.—Table II shows that the Foreign pupils average several months older than their English classmates. Since we usually expect older pupils to achieve the more in junior high school, we cannot account for the poorer work of the Foreign pupils in English as due to their ages, in as much as they are the older and therefore should do the better.

Comparative Mental Ability.—The Foreign pupils are much inferior in mental ability. In grade eight their mean Otis score is less than two-thirds that of their English classmates; in grade nine it is about three-fourths as large; and in grade seven it is about fourteen-fifteenths as large. The inferior achievement of the Foreign pupils may therefore be due to their lesser mental ability. However, the Otis Self-Adminstering Test of Mental Ability is entirely a reading test. Pupils who are not able to read English readily cannot make a good score on this test. Instead of attributing the low achievement of the Foreign pupils to their lesser mental ability, it might be more proper to attribute their lower Otis scores to their lesser reading ability.

Comparative Home Environments.—Table II shows that the homes of the Foreign pupils are inferior to those of their English classmates. In grade eight the mean score on the Sim's Score Card is about three-fourths as large for the Foreign pupils as for the English; in grade nine it is four-fifths as large; and in grade seven, nine-tenths as large. If the Sim's card is a valid measure of the home conditions, it is possible that the inferior homes of the Foreign pupils, especially their relatively limited number of magazines, newspapers, and books, may be a cause of their lesser school achievement.

2. COMPARISON OF MATCHED PAIRS

Comparing two groups by comparing their mean scores covers up many factors. Therefore, it may be more accurate to compare the achievement of a designated English pupil with that of a designated Foreign pupil who is in the same grade and who is approximately his equal in age, mental ability, and home environment. Table III gives the data for twelve English pupils each of whom is matched with a Foreign pupil in grade age, Otis Score and Sim's score.

The third and fourth columns from the right give the scores made on the Language Usage Test. The English pupil of matched pair number one scored 75 on this test, but his Foreign mate made only 56. For every pair except number six, the English pupil scored higher in Language Usage than his Foreign mate. The scores of the twelve English pupils total 1087 points; those of the twelve Foreign pupils total only 833 points, less than 82 percent as much. Since these pupils have been paired on a basis of supposed equal ability to achieve, the fact that they do not achieve equally is still further evidence that the Foreign pupils have some kind of handicap in language usage.

TABLE III

COMPARATIVE ACHIEVEMENT OF 12 MATCHED PAIRS OF "ONLY ENGLISH SPEAKING" AND "USUALLY FOREIGN SPEAKING" PUPILS MATCHED ON THE BASIS OF IDENTICAL GRADES, AND EQUIVALENT CHRONOLOGICAL AGE, MENTAL ABILITY (OTIS SCORE) AND HOME ENVIRONMENT (SIMS SCORE)

Matched Pair Number	Criteria Used for Matching: Chron. Age Eng.	Chron. Age For.	Otis Score Eng.	Otis Score For.	Sims Score Eng.	Sims Score For.	New Stanford Test Scores: Lang. Usage Eng.	Lang. Usage For.	Differences* Eng. Tests	Differences* Non-Eng. Tests
				Grade VII						
1	12- 9	12-10	21	21	9	7	75	56	82	99
2	12-10	12- 5	33	33	7	5	76	56	40	–21
3	12-10	12- 5	33	34	7	5	79	20	119	–68
4	12- 0	12- 2	31	33	9	5	78	20	10	– 8
5	12- 5	12- 5	50	52	6	8	103	56	142	–40
				Grade VIII						
6	13- 9	14- 1	19	21	12	16	73	76	– 1	33
7	13- 4	13- 5	39	40	12	10	97	93	–26	53
8	13-11	13- 8	44	41	15	7	108	101	37	29
				Grade IX						
9	13-11	13- 8	39	40	8	9	101	84	– 1	20
10	13- 5	14- 1	43	41	13	16	86	73	52	110
11	13-10	14- 5	51	51	10	12	108	101	45	– 8
12	15- 6	15- 6	54	51	13	10	103	97	75	–79
Total	160- 6	161- 1	457	458	121	110	1087	833	574	120

*Positive differences mean that the "English" pupil of that matched pair made the higher score; negative differences mean that the "Foreign" pupil made the higher score.

The scores of the two pupils of each pair were compared on each of the other nine sections of the New Stanford Achievement Test. In all of them the English pupil usually excelled his Foreign mate. The complete results are not given here for lack of space, but they are summarized in the two right-hand columns of Table III. These columns are called "Differences." For each pair the sum of the scores made by the Foreign pupil on the five non-English tests was subtracted from the sum made by the English pupil. These differences are given in the right-hand column. A positive difference shows that the English pupil excelled his Foreign mate; a negative difference shows that the Foreign pupil excelled. In pair number one, the English pupil excelled by 99 points on the five non-English tests and by 82 points on the five English tests. In pair number three the English pupil excelled by 119 points on the five English sections, but the Foreign pupil excelled by 68 points on the non-English sections.

A further examination of Table III shows that in 8 of the 12 pairs the English pupil markedly excelled in the English tests; in three of the pairs, numbers 4, 6 and 9, the mates achieved almost equally; and only

in pair number 7 did the Foreign pupil excel, and then by the comparatively small margin of 26 points.

On the non-English tests, the English pupils noticeably excelled in 5 of the 12 pairs; the mates were roughly equal in four pairs, numbers 2, 4, 9 and 11; while in three pairs, numbers 3, 5 and 12, the Foreign pupil excelled.

Summarizing these results, we find that on the English sections only one Foreign pupil excelled, and three others did as well as their mates; while on the non-English sections three Foreign pupils excelled, and four others did as well as their mates. This is yet further evidence that the Foreign pupils are handicapped in their English work. But Table III gives additional evidence on this point. The algebraic sum of the difference for the twelve pairs on the English tests is 574; on the non-English tests it is 120. In other words, the twelve English pupils excel their Foreign mates by a total of 120 points on the non-English sections, but on the English sections they excel their Foreign mates by 574 points—about five times as many.

The answer to the question asked early in this article seems rather definite. In the school tested the junior high school pupils from Foreign speaking homes *are* handicapped in English. In summarizing the evidence which leads to this conclusion we find:

1. On the separate sections of the New Stanford Achievement Test the mean scores made by the English pupils usually excel those made by the Foreign pupils.

2. The differences between the mean scores of the two groups is greater on the English sections than on the non-English sections.

3. The Foreign pupils are generally older than the English pupils and might therefore be expected to achieve more instead of less.

4. Although the Foreign pupils measured considerably the lower in mental ability, this could result because the Otis Test, which is a reading test, penalized them since they are poor readers.

5. The Foreign pupils come from poorer homes and may achieve less partly because of this handicap.

6. When a Foreign pupil was matched with an English pupil in order to equalize grade, age, mental ability, and home environment, we find the English pupils still excel their Foreign mates.

7. The twelve English pupils of the matched pairs excelled their Foreign mates by about five times as many points on the English sections as on the non-English sections.

8. Three of the twelve Foreign pupils excelled their mates on the non-English sections, while only one excelled on the English sections.

II. ON WHAT TEST ITEMS IS THE HANDICAP GREATEST?

The second purpose of this article is to determine the elements of English in which the Foreign pupils are especially handicapped, and to suggest plans for remedial teaching. We have already determined that the greatest handicap was on the "Word Meaning" and "Language Usage" sections of the test (Table I). An analysis of the test items missed and omitted on the Language Usage section would indicate some of the hard spots. A tabulation was therefore made of the items missed or omitted by each pupil on this test. These were called "errors" since the omission of a question usually means that the pupil does not know its answer.

The total errors made on each test item by the 97 English pupils and by the 34 Foreign pupils were determined. These total errors were translated into the percent of each group who missed each item. We could then determine the exact items on which the Foreign pupils had relatively more difficulty than the English pupils. By examining the elements of English involved in these difficult items, we could then plan specific remedial teaching for the Foreign pupils.

The Foreign pupils made the larger percent of errors on 60 of the 74 items of the Language Usage section; on 26 of these 60 items they made two or more times as large a percent of error as the English pupils. These 26 items are shown in Table IV. The English pupils made the more errors on the other 14 items of this section; but on only two of them did they make as much as 2.2 and 3.3 times as large a percent of errors as the Foreign pupils.

A close inspection of Table IV shows that on twelve test items, numbers 10, 14, 17, 24, 32, 33, 34, 36, 39, 51, 60, and 66, the relative amount of error is 2, which means that the Foreign pupils made twice as large a percent of error on these items as did the English pupils. The relative amount of error is 2.3 and 2.6 on two test items—numbers 26 and 41; it is 3 on seven items, numbers 6, 16, 22, 23, 38, 42, and 50; it is 9 on two items, numbers 2 and 4; it is 13 on two items, numbers 3 and 49; and 18 on item 5.

Elements of English Involved in the Handicap.—When we analyze the elements of English involved in these 26 items of the Language Usage

TABLE IV

THE PERCENT OF ERROR AND THEIR DIFFERENCES FOR THE FOREIGN AND ENGLISH PUPILS ON EACH OF THE 26 ITEMS OF THE LANGUAGE USAGE TEST IN WHICH THE FOREIGN PUPILS MADE AT LEAST TWICE AS LARGE A PERCENT OF ERROR AS THE ENGLISH PUPILS

Number of Item*	Percent of Error			Relative Amount of Error
	Foreign	English	Difference	
2	8.9	1.0	7.9	9
3	27.0	2.1	24.9	13
4	8.9	1.0	7.9	9
5	17.8	1.0	16.8	18
6	14.7	5.2	9.5	3
10	24.2	11.4	12.8	2
14	23.5	13.4	10.1	2
16	41.2	13.4	27.8	3
17	44.1	23.7	21.4	2
22	2.9	1.0	1.9	3
23	41.2	13.4	17.8	3
24	23.5	12.4	11.1	2
26	32.4	14.4	18.0	2.3
32	23.5	12.4	11.1	2
33	41.2	19.6	21.6	2
34	26.5	15.5	11.0	2
36	35.3	17.5	17.8	2
38	37.5	13.4	24.1	3
39	44.1	23.7	20.4	2
41	61.8	23.7	38.1	2.6
42	14.7	4.2	9.5	3
49	26.5	2.1	24.4	13
50	47.1	16.5	30.6	3
51	61.8	32.9	28.9	2
60	76.5	38.1	38.4	2
66	73.6	36.1	37.5	2

*These numbers correspond with the question number of the Language Usage Test on Form V of the New Stanford Achievement Test.

Test listed in Table IV, we find that four items refer to choice of synonyms, seven refer to redundant expressions, two to double negatives, two to improper case form of the personal pronoun, one to the confusion of the personal pronoun with the demonstrative adjective, one to lack of agreement of personal pronoun with its antecedent, one to lack of agreement of the verb with its subject, two to incorrect verb forms, one to inappropriate preposition, one to the confusion of the preposition with the conjunction, two to confusion of the adjective with the adverb, one to incorrect placement of adverb, and one to illogical agreement of parts in defining terms.

Plan for Remedial Teaching.—Remedial teaching will be suggested only on those elements of language usage in which the preceding analysis shows a significantly greater amount of error for the foreign speaking

pupils.[1] On these elements the writers make the following suggestions for remedial instruction for foreign speaking pupils:

1. Oral and written composition on the use of specific words showing how to differentiate in meaning and to use them properly in sentences; also a more intensive study of English synonyms.

2. Oral and written composition with much drill on the proper case forms of the personal pronouns showing the specific types of constructions in which each should be used.

3. Oral and written composition and drill planned to familiarize foreign pupils with the principal parts of our most troublesome verb forms.

4. Instruction emphasizing the avoidance of redundant expressions and double negatives.

5. Instruction intended to teach foreign pupils to avoid using the personal pronoun for the demonstrative adjective, the adjective for the adverb, the preposition for the conjunction, an inappropriate preposition, and an incorrect placement of abverbs in sentences.

6. Instruction explaining distinctions between words similar in sound; choice of relative pronoun; choice of mood; and choice of noun to denote intended gender.

In summarizing plans for remedial teaching of English to foreign pupils the writers suggest that the following elements be especially emphasized: correct usages of synonyms and homonyms; case forms of the personal pronouns; verb usages—form, agreement, and mood; avoidance of redundant expressions and double negatives; choice of appropriate preposition; choice of relative pronoun; and choice of noun to denote intended gender.

[1] This paper describes but one limited analysis upon which a few suggestions for remedial work are based. General suggestions for other kinds of diagnosis and remedial work may be found in an article by Brueckner, Leo J., "Diagnosing Pupil Difficulties," *Journal of the N. E. A.*, XXI (April, 1932), pp. 123-125.

THE INTERVIEW TECHNIQUE AS A MEANS OF DIAGNOSING

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INADEQUACIES OF PRESENT METHODS OF DIAGNOSIS

THE development of the testing program has clearly demonstrated that individuals vary widely in mental ability. Much material considered non-essential for the individual in child or adult life has been eliminated from the curriculum. Various plans are being used in putting courses of study into effect in order that individual differences may be met. Regardless of the type of program being followed, the success of instruction is still measured to a large degree in terms of the progress of the average child of the group.

The reason for this situation may be that the success of the classroom teacher is often determined by the change produced in median scores of standardized tests during the year. Emphasis has been placed upon the total score determined by the number of right answers rather than upon how and why a child arrived at a particular score. For the most part diagnosis has been limited to inspection of the test paper.

In a recent study of multiplication completed by the writer, diagnosis by inspection of the test papers was found to be inadequate for determining the mental processes involved in the children's methods of work.[1] It was possible to detect errors in placing the partial products, giving zero the value of one, and other errors of that type from the original papers; but it was impossible to understand the mental processes involved in obtaining the combinations and methods of carrying from written responses. In the written responses, too often the side work which is so indicative of the child's method of work, was erased from the page or done on scratch paper and discarded.

In order to secure the data required for analysis of the children's methods of work, the inspection of the test papers was supplemented by the interview technique. The technique proved to be most effective in securing the needed information.

INTERVIEW AS A SUPPLEMENTARY MEANS OF DIAGNOSIS

By the interview technique is meant having children solve exercises orally and questioning them on any response which does not indicate

[1] Burge, Lofton V. *Types of Errors and Questionable Habits of Work Involved in the Mechanics of Multiplication.* Unpublished Doctor's dissertation (Ann Arbor, Michigan: University of Michigan, 1932), p. 143.

their methods of work. The success of the interview as a means of diagnosis depends primarily upon the development of a careful technique and method of approach to the child. An effort should be made to secure the objective coöperation of the pupils, with emphasis upon the method of work rather than the results obtained. Throughout the interview it will be necessary for the children to solve aloud the exercises on a work sheet given them at the beginning of the interview. If the child shows any hesitancy in his work, he should be questioned as to how he arrives at his answers. For example, in multiplying 327×29, a child hesitating at the combination 9×7 should be asked how he obtained the result. If the oral explanation is not clear to the experimenter, the child should be requested to illustrate his method of work. Similar number situations should be presented for determining whether the habits of work are accidental or fixed.

ILLUSTRATIONS OF INTERVIEWS

Typical interviews applicable to the classroom situation may be illustrated by examples taken from work sheets of the pupils.

1. G. E., a boy of the 4H grade, ten years old, on the original test displayed difficulty with multipliers above the five's. He was asked, therefore to solve the problem 962×4 because it involved a multiplier with which he was familiar.

Experimenter: G. E., I am interested in learning just how pupils do their arithmetic problems. Will you solve the problem 962×4 orally that I may understand how you do your arithmetic work?

G. E.: Four times 2 are 8; 4 times 6 are 24; put down 4 and carry 2; 4 times 9 are 36 and 2 are 38.

Experimenter: That is right.

The boy was then asked to solve the problem 70×6. His work sheet showed the following process by which he arrived at the correct results:

70	7
6	7
—	7
420	7
	7
	7

G. E.: Six times 0 are 0; put down 0; 6 times 7 (paused).

Experimenter: Do you know how many six 7's are?

G. E.: No.

Experimenter: When you are working at your own desk, do you have any means of determining those difficult combinations?

G. E.: Yes.

Experimenter: Will you show me just how you find them?
G. E.: I write down six 7's and add them (began at 14 and counted to 42 by making dots).

In solving the problem 632×9, the process was as follows:
G. E.: Nine times 2 are 18; put down the 8 and carry the 1; 9 times 3 are 27 and 1 are 28; put down the 8 and carry the 2; 9 times 6 (paused).

Experimenter: Do you know how much nine 6's are?
G. E.: No.

Experimenter: How would you find this combination?
G. E.: I would set down nine 6's.

Experimenter: Let me help you with your work. Nine 6's are 54.
G. E.: Fifty-four and I had 2 to carry; 54, 56.

Experimenter: Let's solve the problem 965 times 7.
G. E.: Seven times 5 are 35; put down 5 and carry 3; 7 times 6 (paused).

Experimenter: (Waited to see if G. E. would associate 7×5 and 7×6) forty-two.
G. E.: Forty-two and 3 to carry are 45; 7 times 9 are (paused).

Experimenter: Sixty-three.
G. E.: Sixty-three and 4 (paused) 67.
Experimenter: How did you add 63 and 4?
G. E.: I just thought of it.
Experimenter: Tell me how you thought of it.
G. E.: I just thought 63, 64, 65, 66, 67.

The boy showed evidence of counting even in carrying 2 or 3. The pauses, however, were not lengthy enough to warrant questioning. In solving the problem 560×107, G. E. was told the combination 6×7. He wrote in zeros when multiplying by zero, but was able to place the partial products correctly. The above problem is evidence of correct form even with a three-digit multiplier before the higher combinations are known.

The method of obtaining the higher combinations shows rather conclusively that G. E. had formed no associations with the higher and lower combinations. In solving the problem 965×7, he knew that seven 5's were 35; but on the next combination, he was unable to give a response to seven 6's even after sufficient time was given him to add 7 and 35.

2. D. C., a boy ten years four months old in the 6L grade, was asked to solve aloud the problem 70×6.

D. C.: Six times 0 are 0; 6 times 7 (hesitating) are 42.
Experimenter: How do you know that six 7's are 42?
D. C.: Two 7's are 14 and 3 times 14 are 42.

Experimenter: Multiply 967 by 7.

D. C.: Seven times 5 are 35; 7 times 6 (hesitating) are 42; put down 2 and carry 4; seven times 9 (hesitating).

Experimenter: Don't you know seven 9's?

D. C.: No.

Experimenter: How would you find the answer to seven 9's if you were working alone?

D. C.: I would write them down and figure it out.

Experimenter: Will you show me just how you would do that?

D. C.: Yes. I write down seven 9's; I know that 9 and 9 are 18; I have three 18's and 9 to add; 8 and 8 are 16 and 8 are 24 and 9 are 33; put down the 3 and carry 3; 3, 4, 5, 6 make 63 and 4 to carry and 67.

```
  9
  9
 —   18
  9
  9
 —   18
  9
  9
 —   18
  9   9
      —
     63
```

In the solution of the remaining problems shown on D. C.'s work sheet, it is clear that he used lower combinations and addition to obtain the combinations above the five's. In most of the higher combinations, D. C. was able to do the work mentally. When he had occasion to use an odd multiplier times the 8's or 9's, as seven 9's or 8's, D. C. seemed to become confused and resorted to the side work illustrated above. He wrote rows of zeros in multiplying by zero but had no difficulty in multiplying zero in the multiplicand.

3. The original test paper of C. F., a boy eleven years old of the 6H grade, showed that most of the problems on Part 4 of the Compass test were attempted, but only a few of the problems showed the correct answer. For this reason, C. F. was selected for an interview. Since the problems which showed difficulty were the ones with three- or four-digit multipliers, C. F. was asked to solve the more complex problems.

After providing the boy with work sheet and pencil, the experimenter worked an easy problem orally by way of illustration, and then asked C. F. to multiply 960 x 375. The written solution was as follows:

960
375

4800
6540
2880

358200

C. F.: Five 0's are 0; five 6's are 30; five 9's are 45 and 3 are 48; seven 0's are 7; seven 6's are 42; seven 9's are (hesitating) 63 and 2 to carry are 65.

Experimenter: Did you know seven 9's as soon as you saw it?

C. F.: No.

Experimenter: How did you get the correct answer?

C. F.: I knew seven 7's were 49, and then I thought seven 8's were 56 and seven 9's were 63.

Experimenter: Multiply by the 3.

C. F.: Three 0's are 0; three 6's are 18; three 9's are 27 and 1 to carry are 28 (placed the partial products and added them correctly).

Experimenter: Multiply the problem 848 times 689 for me.

C. F.: Nine 8's are (hesitating) 72 and 3 to carry are 75.

Experimenter: How did you know nine 8's?

C. F.: I knew eight 8's were 64, and then I thought of 72.

Experimenter: Now multiply by the 8.

C. F.: Eight 8's are 64; eight 4's are 32 and 4 to carry are 36; eight 8's are 64 and 6 are 70 (carried wrong number); six 8's are 48 and 2 are 50.

In solving other problems, it was clear that C. F. always carried the smaller number. On being questioned as to why he did this, he said that it was necessary to carry one of the numbers and it was much easier to carry the smaller.

The illustrations given in the interviews show conclusively how incomplete would be any analysis of errors taken from written or oral responses that were not supplemented by questioning. In the complete inventory of errors and questionable habits derived from the study there were many which required an interview to determine with any degree of certainty the mental processes involved.

TABLE I

ERRORS AND HABITS OF WORK REQUIRING AN INTERVIEW DISTRIBUTED ACCORDING TO GRADES

Error or Habit	Percentage of Pupils in Each Grade					
	Fourth		Fifth		Sixth	
	Low	High	Low	High	Low	High
Error in combinations	29.1	17.5	33.6	25.3	30.5	24.1
Repeats tables from known combination	6.7	5.2	6.4	6.8	6.1	4.7
Repeats tables from first	3.7	1.9	3.1	0.8	2.9	0.8
Wrong combination fixed	3.4	1.9	3.1	2.5	5.6	3.0
Counts from a known combination	2.5	2.3	2.9	1.7	5.0	2.2
Uses lower combination and addition in obtaining the higher combinations	2.5	1.9	8.4	11.8	12.3	11.5
Depends on tables	0.6	0.4	0.7	0.2	0.4	0.0
Counts on fingers from known combination	0.3	1.5	1.1	2.1	2.9	3.0
Subtracts from known combination	0.0	0.0	0.2	0.6	1.7	1.1
Counts in getting carried number	15.6	8.5	9.1	9.5	9.4	8.5
Error in carrying	8.9	6.9	11.5	9.3	12.9	6.0
Carries wrong number	7.3	5.8	5.7	4.0	6.1	4.4
Forms mental image of combinations	2.8	0.8	1.8	4.0	5.8	4.7
Counts on fingers to get number carried	2.1	3.1	2.4	2.1	2.7	2.2
Carries smaller number	0.3	0.0	0.0	0.2	0.2	1.1
Builds units digit to tens	0.0	0.2	2.0	1.9	2.1	3.0
Multiplies digits in multiplicand by corresponding digits	13.1	2.1	3.3	3.2	1.7	1.1
Uses multiplicand as multiplier	4.3	3.3	6.6	5.9	5.4	5.2
Multiplies the carried number	1.8	0.8	0.7	0.2	1.5	0.0
Error in addition combinations	3.4	3.7	6.6	6.3	3.1	1.9
Counts to get combinations	0.9	1.7	1.8	1.9	1.9	0.8
Error in carrying	0.6	1.0	1.5	1.3	1.3	1.1
Groups numbers to add	0.6	0.8	1.8	2.5	2.3	0.8
Number of pupils in each grade	327	480	453	473	479	365

Table I presents a number of errors and questionable habits which were not self-evident from the test papers and which were studied by interviews with the children. *Error in combination, repeats tables from a known combination, uses lower combination and addition in obtaining the higher combinations, counts in getting carried number,* and *error in carrying* display the highest frequencies. The remaining errors and habits are of relatively low frequency but are significant in the cases of individual pupils.

It is impossible to detect with certainty many of the methods used by children in obtaining the multiplication combinations from an inspection of written work. For instance, habits which cannot be detected are: (1) different methods of repeating tables either from the first or from known combinations; (2) counting from known combinations; (3) determining a combination from a known higher combination; (4) using lower combination and addition in obtaining the higher combinations. *Errors in combinations* and *wrong combinations fixed* could be determined from the written work, provided the combinations were given in abstract form in which carrying was not included.

Various questionable devices were used by the children in carrying. For example, if a child had 36 and 7 to carry, he might think in terms

of ending and say 43. The children used different methods of counting in bridging the 10's. Oftentimes the counting was in the form of rote counting in which the child said 37, 38, 39, etc. Some children built unit's digits to 10's and thought 40, then 43; others broke the carried number into convenient parts and added rhythmically. In fact, there seemed to be no fixed form in breaking numbers for carrying. In carrying 7, the number was often divided into 3-3-1; 2-2-3; 4-3; 3-2-2.

Exercises of three or more digits in the multiplier, involving addition of partial products, provides for various methods of grouping numbers in adding the partial products and also various forms of counting which require an interview to determine with any degree of certainty the mental processes involved in the work.

THE TEACHER'S USE OF THE INTERVIEW

The significance of the interview to the classroom teacher in her diagnosis of individual need, as a basis for her instructional program, is obvious. Through the use of the interview the teacher may determine corrective measures for the errors and habits of badly maladjusted children as well as the needs common to all children. She may also develop preventive teaching methods to obviate the error-forming habits.

If pupils of different levels of intelligence are interviewed, it will probably help the teacher to appreciate the fact that not only pupils of low intelligence use cumbersome methods of work, but brighter children use the same methods with a higher degree of efficiency, thus making the average score for the grade. The procedure of interviewing bright pupils will not only give a check upon the methods of these gifted children but will also help to eliminate the idea that only the slow pupils are having difficulties.

The success of diagnosis by the classroom teacher will depend largely upon the pupil-teacher coöperation. The children should not be told that they are having difficulty and their methods of work are wrong. An approach of this type will cause many children to conceal the methods they are using. If a child counts by rote from twenty-four to forty-eight in obtaining 6 x 8, the teacher should use the information only in preparing future instructional programs in which the child will be able to see that there is a real purpose in learning the combinations.

For the teacher to adequately adjust the instructional program to the needs of individual pupils it is necessary that she have a complete knowledge of the pupils' methods of work. A careful analysis of written work

done on formal tests will conserve the teacher's time in securing information as to the levels of work at which many difficulties appear. If the teacher eliminates scratch paper and requires the pupils to use pencils without erasers, much information as to the types of difficulties encountered may be obtained from the side work supplemented by a few minutes' interview.

SUMMARY

The present conflict between the theoretical emphasis upon the individual and the practical emphasis upon the average scores as a measure of success has led to confusion in the practice of classroom teachers. Diagnosis has been limited largely to inspection of test papers. The inadequacy of this means of diagnosis is conspicuously obvious in the results presented. The study clearly shows that the interview is an essential technique of the classroom teacher, practical to administer and invaluable to the instructional program.

FINANCIAL RETRENCHMENT AND LOWER GRADE STUDENTS

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IN a time of economic stress it is not unnatural that legislatures should inquire of state college and university administrators whether budgets might be reduced if low-grade students were not admitted. This question has already been raised in numerous states, including Ohio.

Several months before this query was voiced by the Ohio legislature, President Rightmire of Ohio State University asked the writer to study the performance of low-grade entrants to his institution in order that facts might be available for legislative discussion. It is the purpose of this article to report the method of investigation employed and the findings.

After surveying the data, the problem for investigation was finally stated as follows: To discover the performance in terms of point-hour-ratios of all freshmen entering the university in the fall quarters of 1927, 1928, and 1929 who were: (1) rated as poor in high school scholarship by their principals, (2) rated in the lowest third on the Ohio State University Psychological Test, or (3) rated low both in scholarship and intelligence. The study specifically sought to determine:

1. The number and percentage failing and for this reason dropping out of the university, and the mean persistence of residence of the group.
2. The number and percentage dropping out while doing passing work (defined as a 1.8 cumulative point-hour-ratio at the end of the last quarter of residence) and the mean persistence of residence of the group.
3. The number and percentage still in residence or already graduated and the mean persistence of residence of the group.

From the annual reports of the Intelligence Testing Committee for the years 1927, 1928, and 1929, the names and percentile ranks of students scoring in the lowest third on the Ohio State University Psychological Test were secured. The names of all lowest third students in high school scholarship were secured from the offices of the secretaries of the five larger colleges admitting freshmen: Agriculture, Arts, Commerce, Education, and Engineering. University performance and point-hour-ratios also were secured from the college offices of the five colleges. These

data were transferred to tally sheets, and arithmetical means and probable errors were obtained for all groups in all colleges during the three years.

The analysis of the data collected has produced the following results:

1. *The Intelligence Factor:* The results of the study of the intelligence factor for all five colleges, and the combination of all students in all five colleges, are summarized as follows:
   a. Of the students entering the university during the fall quarters of 1927, 1928, and 1929, approximately 45 percent failed out of the university, but not before having had a mean persistence of about 3½ quarters.
   b. Those who dropped out of the university while doing passing work totaled approximately 24 percent, with a mean persistence of approximately 4½ quarters.
   c. Those continuing in residence or graduating totaled 31 percent, with a mean persistence of about 12 quarters.
   d. The performance of students from the lowest third of intelligence is similar in all colleges with the exception of Agriculture, in which college the students of lowest grade intelligence was considerably out of line. If Agriculture students were not included in this study, the composite mean persistence would remain about the same, but the percentage of students who failed out would increase to about 50 percent, and the percentage of students who dropped out while doing passing work would be decreased to about 19 percent.
2. *The High School Scholarship Factor:* Data on the performance of students who stood in the lowest third in high school scholarship are summarized as follows:
   a. Those who failed out constituted 44 percent, with a mean persistence of about 4 quarters.
   b. Those who dropped out while doing passing work constituted approximately 26 percent, with a mean persistence of 5 quarters.
   c. Those who graduated or continued in residence constituted about 30 percent, with a mean persistence of 12½ quarters.
   d. Here also the performance of Agriculture students is not in agreement with the students of the other four colleges.
3. *Both Intelligence and High School Scholarship:* The data for the combination of both factors are summarized as follows:

a. Students who failed out constituted 69 percent, with a mean persistence of 3 quarters.
b. Those who dropped out while doing passing work constituted 12 percent, with a mean persistence of 4½ quarters.
c. Those who graduated or are still in residence constituted 19 percent, with a mean persistence of about 12 quarters.
d. Again the performance of Agriculture students is out of line with the students of the other four colleges.

As pointed out in the first paragraph, the financial situation of the state has been the chief reason for studying the admissions policy of the university at this time. The practical issue involved is this: Can the budget of the university be reduced by refusing admission to applicants with lower third intelligence, with lower third high school scholarship, and with a combination of both of these handicaps? In order to answer this question, T. C. Holy of the Bureau of Educational Research of Ohio State University coöperated with George W. Eckelberry, Assistant to the President, during the summer months in gathering the necessary data.

These investigators collected information for 1931-32 from every department in the university with the exception of those in the Colleges of Law, Medicine, and Dentistry which do not admit freshmen. They sought to discover how many sections could be abandoned if freshman registration were lowered and what the total salary reduction would be as a result of the discontinuation of such sections. They collected data as follows:

1. The total enrollment for each course.
2. The number of sections in each course and their average size.
3. The number of sections that might be eliminated if the lower group of freshmen were refused admission. They estimated the number of these freshmen to be 877.
4. Using eight sections as a teaching load for each instructor during the academic year of three quarters, they determined the number of instructors who could be dropped by the abandonment of some sections.
5. Using average salaries paid in each department, they determined the reduction in payroll that would result from dropping instructors.

Their findings are summarized below:

The Holy-Eckelberry statistics can be applied readily to the data in the present study. They built up their estimates using 877 students as their base. The base for the present study is 833—the average of the 845

TABLE I

SECTION AND SALARY REDUCTION POSSIBLE AT OHIO STATE UNIVERSITY IF LOWER THIRD FRESHMEN ARE REFUSED ADMISSION

Department	Freshmen Sections Eliminated	Salary Reductions by This Elimination
Botany	12	$ 2,700
Business Organization	5	1,500
Chemistry	40	7,000
Economics	6	1,500
Engineering Drawing	14	2,000
English	49	14,400
Geography	10	2,000
Geology	4	1,600
German	9	2,000
History	15	4,000
Mathematics	19	3,000
Military Science	..	500
Physical Education	..	5,000
Psychology	14	4,500
Romance Languages:		
French	12	2,300
Spanish	9	1,800
Zoology and Entomology	14	3,000
Total		$58,800
Other estimated reductions in administrative departments and other costs resulting from this limitation		$ 5,000
Grand total reduction		$63,300

admitted in 1927, the 797 in 1928, and the 858 in 1929. The difference between 877 and 833 is so slight that the sections and salary reductions for 833 students would be approximately the same as for 877 students. We may then proceed to compare the economics resulting from fewer sections and the diminished income from fewer students.

This comparison demonstrates that the university would sustain a net loss of $7,505 a year should lower grade freshmen not be admitted. This figure is arrived at as follows:

Tuition from 833 students at $85 a year	$70,805
Estimated reductions from abandoned sections	63,300
Net loss to the university	$ 7,505

From the data concerning the performance of low-grade applicants for admission, together with the data concerning financial implications, the following conclusions seem to the investigator to be pertinent:

1. In view of the findings of this investigation already summarized, it may be concluded that it is impossible for the university, with its present instruments of measurement, to reject students in the lowest third of high school scholarship groups or in the lowest third of performance on the Ohio State University Psychological Test, without

eliminating a large percentage of students who are likely to do successful university work.

2. In a discussion of these data, which followed a presentation of the question before a group of educational research people at the University of Minnesota in September, 1932, it was pointed out to the writer that if the university should make its admission policy more stringent, the State of Ohio would more than likely follow the experience of the State of California. Some twenty-five years ago, the University of California established stricter admission requirements than were then in vogue at other state universities. The result was that junior colleges grew up throughout the State of California, and their existence now constitutes a perplexing administrative problem, not only for the University, but for the state legislature.
3. The analysis of the financial implications of this study as summarized on the preceding pages makes it obvious that if the university should drop the groups of students studied in this investigation, it would be losing more income from tuition than it would be saving in expense of operation for salaries.
4. The Ohio legislature—and for that matter, legislatures in other states—should carefully evaluate facts such as these before imposing upon state universities and colleges an admissions program which is justified neither in financial fact nor in educational theory.

NECESSITY FOR USE OF A NON-LANGUAGE MENTAL TEST IN GROUP INTELLIGENCE TESTING

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THE assertion has been frequently made that it is impossible to have adequate representation of pupil intelligence, especially in communities with a portion of the population speaking languages other than English, by the use of group intelligence tests unless some non-language test be used. With the intent of checking the truth of this assertion insofar as it might apply in East Chicago, the investigation herein reported was undertaken.

The population of East Chicago is chiefly industrial. It includes people of recent European, Mexican, and negro stock as well as some of native white birth. The pupils who were the subjects in this investigation, although a majority of them were native born, have a parentage and a language environment which make them satisfactory for this study. In fact, over fifty percent of them are from homes in which the language used is either exclusively or partially foreign.

All pupils enrolled in 4B grade, 453 altogether, were examined in September, 1929, with the Haggerty Intelligence Examination, Delta 2,[1] and with the Pintner Non-Language Mental Test.[2] These particular tests were chosen for several reasons: they have been widely used; they were accorded favorable rank among intelligence tests by a number of judges passing upon the general excellence of such tests for individual measurement;[3] and, the author's previous experience with these and other tests had shown that the two tests chosen gave distributions which were more nearly normal when used with pupils of this grade than certain other tests.

Both of the tests were given by one examiner who had had satisfactory training and experience in test administration. She gave the tests under classroom conditions with special attention to varying the order in which they were given. If she gave the Haggerty Test to a section on one day,

[1] Haggerty, M. E. *Haggerty Intelligence Examination, Delta 2.* Yonkers-on-Hudson, New York: World Book Company, 1920.
[2] Pintner, Rudolph. *A Non-Language Mental Test.* Columbus, Ohio: The College Book Company, 1919.
[3] Kelley, T. L. *Interpretation of Educational Measurements* (Yonkers-on-Hudson, New York: World Book Company, 1927), pp. 222-223.

the Pintner Test was given to that section on the following day. Thus about one-half of the pupils were first tested with the Haggerty Test and about one-half with the Pintner Test.

The tests were scored by competent clerks following the usual scoring practices. The raw scores on the Haggerty Test were converted into intelligence quotients; those on the Pintner Test, into mental indices.[4] In each case the directions and tables provided in the author's manual were carefully followed. In order to insure correctness of method of conversion of raw scores into mental indices, wherein some doubt existed, there was correspondence with the author.

The language status of the pupils was ascertained through the section teachers. They were supplied with a form on which they were asked to check for each pupil under one of three headings the degree of English language handicap. The three headings were: "Parents speaking English exclusively;" "Parents speaking a foreign language exclusively;" and "Parents speaking some English and some foreign language." The information by which the teachers checked the form was obtained from the pupils individually in response to a query concerning the language the parents used in the ordinary conversation of the home. The data showed that there were 194 pupils whose parents spoke English exclusively and 259 whose parents used a foreign language more or less in conversing with the child. For the purpose of this investigation no differentiation was made between pupils whose parents spoke a foreign language exclusively and those whose parents spoke some English and some foreign language. The two classes were called for on the form in order to prevent children whose parents spoke some English being recorded as children of parents speaking English exclusively.

Three scatter diagrams were made of the IQ's and mental indices of the pupils. One was for the entire 453 pupils without regard to language handicaps. The second was for the 194 pupils whose parents were exclusively English speaking. The last one was for the 259 pupils whose parents did not speak English exclusively.

Table I is the scatter diagram of the entire number of 4B pupils tested. It shows that there was considerable correlation between the two

[4] The term "mental indices" is used by the author of the test to express measures of mental ability. Indices run from 0-100. Pupils with indices below 40 are considered as mentally retarded; those with indices above 60 as mentally bright. The mental index of any pupil is obtained from a table in the manual which gives the index at different ages corresponding to a raw score on the test.

tests, the coefficient of correlation being .584 ± .020. The reliability of this coefficient is confirmed by the slightly lower coefficient of .532 ± .021 obtained in 1928 from the results of testing 4B pupils of that year with the same two aforenamed tests. The fact that the correlation is not higher indicates, however, that the results from the two tests were influenced by some non-identical factors. The other two tables, as later discussion develops, show that one of these factors is the language handicap, if the Pintner Test be accepted as a non-language intelligence test.

TABLE I

A Scatter Diagram Correlating the Mental Indices from the Pintner Non-Language Mental Test with the IQ's from the Haggerty Intelligence Examination, Delta 2, of 453 Pupils in Grade 4B

Haggerty IQ's From	Haggerty IQ's To	Pintner Mental Indices 0 4	5 9	10 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 74	75 79	80 84	85 89	f
140	144												1				1			2
135	139																			
130	134															2		1	1	4
125	129													1	2	1	2			6
120	124											1	2	2	2	4		1		12
115	119		•								1	1		5	4	3	4	4	2	24
110	114										1	2	2	2	4	3	1	1	1	17
105	109										6	2	4	3	6	8	4	3		36
100	104											1	4	8	18	11	1			43
95	99									2	5	5	13	16	12	12	3	1		69
90	94									1	7	9	14	23	20	3	2			79
85	89									6	7	9	12	8	13	8	1			64
80	84						1		3	6	5	10	9	7	2	2				45
75	79								3	1	6	6	1	1			1			19
70	74						1	2		5	2	1	4	2	1					18
65	69							1		1	4	1								7
60	64				1				1	2										4
55	59							1	1	1										3
50	54	1																		1
f		1			1		2	4	8	25	44	48	66	78	84	57	20	11	4	453

r = .584 ± .020

Pintner Indices: M. = 60.11; Med. = 61.76; Q1 = 52.9; Q3 = 68.7; σ 11.5
Haggerty IQ's: M. = 95.68; Med. = 94.14; Q1 = 86.3; Q3 = 103.5; σ 14.2

It is interesting to note in Table I that the pupil with the lowest standing on the Pintner Test also had the lowest standing on the Haggerty Test. This pupil, a colored boy of English-speaking parents, together with several others who were low on both tests have been transferred to special subnormal sections. Two of the three pupils in the second lowest interval on the Haggerty Test but with a trifle better standing on the Pintner Test are of foreign-language parents. The one pupil in the third lowest interval on the Haggerty Test and in the fourth lowest interval (second lowest index) on the Pintner Test has parents who speak a foreign language. The pupil in the highest interval on the Haggerty Test but below the mean on the Pintner Test has English-speaking

parents. The other pupil in the highest interval on the Haggerty Test and in the third highest interval on the Pintner Test has parents who speak very broken English. Four pupils are shown in the highest interval on the Pintner Test. The one with the IQ in the 130-134 interval on the Haggerty Test is from English-speaking parentage. The other three with much lower standings on the Haggerty Test are from homes in which a foreign language is spoken. The pupil in the third highest interval on the Pintner Test with an IQ of 78 as determined by the Haggerty Test is from a foreign home. The pupil who is in the 65-69 interval on the Pintner Test but in the 70-74 interval on the Haggerty Test comes from a foreign speaking home. This study of individuals with positions fringing the scatter diagram seems to indicate that there is a tendency for pupils from foreign-language homes to have improved positions in the Pintner Test distribution in comparison with their positions in the Haggerty Test distribution.

Analysis of Table I also shows that there is a greater tendency for pupils to be below the mean on the Haggerty Test and above the mean on the Pintner Test than for pupils to be below the mean on the Pintner Test and above the mean on the Haggerty Test. In other words, good

TABLE II

A SCATTER DIAGRAM CORRELATING THE MENTAL INDICES FROM THE PINTNER NON-LANGUAGE MENTAL TEST WITH THE IQ'S FROM THE HAGGERTY INTELLIGENCE EXAMINATION, DELTA 2, OF 194 PUPILS IN GRADE 4B OF ENGLISH-SPEAKING PARENTAGE

		Pintner Mental Indices																	
Haggerty IQ's	From / To	0 4	5 9	10 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 74	75 79	80 84	85 89	f
140-144													1							1
135-139																				
130-134																1			1	2
125-129															2	1	1			4
120-124												1			1	2				4
115-119											1	1		4	4	3	1	3		17
110-114											1	1	1	2	2	1		1		9
105-109											2	1	2	2	4	5	2	1		19
100-104												1	1	3	4	4				13
95- 99										1	2	2	8	9	5	8	2	1		38
90- 94											2	3	5	11	8	0				29
85- 89										6	3	3	6	3	3	2				26
80- 84									1	3		2	1	2		1				10
75- 79									3	1	5	1								10
70- 74							1	1		4										6
65- 69								1		1										2
60- 64										2										2
55- 59									1											1
50- 54		1																		1
f		1					1	2	5	18	16	16	25	36	33	28	6	6	1	194

r = .641 ± .028

Pintner Indices: M. = 59.50; Med. = 61.80; Q1 = 51.7; Q3 = 68.8; σ 12.3
Haggerty IQ's: M. = 97.71; Med. = 96.32; Q1 = 88.2; Q3 = 106.9; σ 14.8

standing on the Haggerty Test was more apt to mean good standing on the Pintner Test than was good standing on the Pintner Test to mean good standing on the Haggerty Test. This may be interpreted to mean that there was some factor that made good accomplishment possible for pupils on the Pintner Test which handicapped them on the Haggerty Test.

Tables II and III are the scatter diagrams for the 453 pupils separated into two groups, those of English-speaking parentage and those of foreign-language-speaking parentage.

Table II shows the correlation of the two tests for the 194 pupils of English-speaking parentage; Table III, for the 259 pupils whose parents speak a foreign language. The coefficient of correlation for the former, .641 ± .028,is noticeably higher than the coefficient of correlation for the latter, .553 ± .029. By eliminating from the total tested those pupils whose parents speak a foreign language, the coefficient is raised from

TABLE III

A Scatter Diagram Correlating the Mental Indices from the Pintner Non-Language Mental Test with the IQ's from the Haggerty Intelligence Examination, Delta 2, of 259 Pupils in Grade 4B of Foreign-Language-Speaking Parentage

Haggerty IQ's	From / To	0 4	5 9	10 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 74	75 79	80 84	85 89	f
	Pintner Mental Indices																			
140-144																	1			1
135-139																				
130-134																1		1		2
125-129														1			1			2
120-124													2	2	1	2		1		8
115-119														1			3	1	2	7
110-114												1	1		2	2	1		1	8
105-109											4	1	2	1	2	3	2	2		17
100-104													3	5	14	7	1			30
95- 99										1	3	3	5	7	7	4	1			31
90- 94										1	5	6	9	12	12	3	2			50
85- 89											4	6	6	5	10	6	1			38
80- 84							1		2	3	5	8	8	5	2	1				35
75- 79											1	5	1	1			1			9
70- 74								1		1	2	1	4	2	1					12
65- 69											4	1								5
60- 64					1				1											2
55- 59								1		1										2
50- 54																				
f					1		1	2	3	7	28	32	41	42	51	29	14	5	3	259

r = .553 ± .029

Pintner Indices: M. = 60.57; Med. = 61.73; Q1 = 53.5; Q3 = 68.6; σ 10.9
Haggerty IQ's: M. = 94.21; Med. = 92.65; Q1 = 84.9; Q3 = 101.8; σ 13.7

.584 ± .020 to .641 ± .028. By eliminating from the total tested those pupils whose parents speak English exclusively the coefficient is lowered from .584 ± .020 to .553 ± .029. Clearly, membership in a foreign-language home was a factor influencing the results.

Analysis of Table III shows a situation similar to that shown by the analysis of Table I. It is similar but more exaggerated. Good standing on the Haggerty Test was more likely to mean good standing on the Pintner Test than was good standing on the Pintner Test to mean good standing on the Haggerty Test. It is evident, therefore, that the factor which was observed as present and influencing results when all pupils are considered is still present and influencing results when only the pupils of parents speaking a foreign language are considered.

Analysis of Table II shows a different situation. It shows that there is no greater tendency for pupils of English-speaking homes to be below the mean on the Haggerty Test and above the mean on the Pintner Test than for pupils to be below the mean on the Pintner Test and above the mean on the Haggerty Test. Good standing on the Haggerty Test was no more likely to mean good standing on the Pintner Test than was good standing on the Pintner Test to mean good standing on the Haggerty Test. It is evident, therefore, that by eliminating the pupils from homes speaking a foreign language, one of the factors that lessened the value of results from one test for predicting results from the other has been eliminated.

Table IV, which is a summary tabulation of data given in the three other tables, compares the central tendencies of the different distribu-

TABLE IV

A COMPARISON OF CENTRAL TENDENCIES OF THE DISTRIBUTIONS OF MENTAL INDICES AND IQ'S OF THE THREE GROUPS CONSIDERED

Groups	Mean		Median		Q1		Q3	
	Pintner Indices	Haggerty IQ's	Pintner Indices	Haggerty IQ's	Pintner Indices	Haggerty IQ's	Pintner Indices	Haggerty IQ's
All 4B's	60.11	95.68	61.76	94.14	52.9	86.3	68.7	103.5
English 4B's	59.50	97.71	61.80	96.32	51.7	88.2	68.8	106.9
Foreign 4B's	60.57	94.21	61.73	92.65	53.5	84.9	68.6	101.8

tions. The mean of the indices of the foreign-language group is the highest, but the mean of the IQ's of this group is the lowest. This is further confirmation of the assumption made previously in this discussion that the Pintner Test is a more accurate measure of the intelligence of pupils of a mixed language environment than is the Haggerty Test. The comparison of medians likewise supports the hypothesis, for the median of the indices of the foreign-language group is practically coincident with the median indices of the other groups, while the median IQ of the foreign-language group is noticeably lower. The other measures of central tendency, the first quartile and the third quartile, comparing

similarly, give additional confirmation to the superiority of the Pintner Test. The differences which have been noted here are not marked, but they are sufficient to lead to the conclusions which are drawn.

From the data of this study it may be concluded that:

1. The Pintner Non-Language Mental Test and the Haggerty Intelligence Examination, Delta 2, as measures of intelligence are influenced by some identical and some non-identical factors.

2. The language used in the homes of pupils tested is one of the non-identical factors. Pupils from homes that use a foreign language tend to get results on the Haggerty Test which indicate lower ability than they evidently possess.

3. The intelligence of pupils in a foreign-language community is inadequately represented by the use of results of either of the two tests alone. If only one test is to be used, however, the Pintner Test seems to be the better instrument.

THE RELATION OF OCCUPATIONAL INTEREST SCORES AS MEASURED BY THE STRONG INTEREST BLANK TO ACHIEVEMENT TEST RESULTS AND COLLEGE MARKS IN CERTAIN COLLEGE SUBJECT GROUPS

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THE results on the Strong Vocational Interest Blank[1] are being used by personnel directors in colleges as an aid in vocational guidance. Considerable literature is available on the use of the Strong Vocational Interest Blank and some of the previous questionnaires from which the Strong blank was developed.[2]

This study takes up the relation of the results on this test, when scored for various vocations with achievement test results, and college marks in certain subject groups. These questionnaires are made up of several hundred items to which an individual reacts to show his interest. By inspection it is seen that some of these items are more or less directly related to interest in certain occupations. Other items do not seem to be directly related to any occupation. It seems possible, therefore, that the interest scores on some of the occupations might also show a significant relationship with achievement in different college subject groups. The present study has used for this purpose the interest scores in engineering, law, medicine, etc., which are obtained from different scorings of the responses to the Interest Blank. A previous study had shown the possibilities in this direction with the Cowdery Interest Blank, an earlier interest blank.[3] This then is a study of interest scores for vocations as factors in educational guidance insofar as educational guidance can be considered apart from vocational guidance.

For this study a random sampling of the records of 100 junior college

[1] *Vocational Interest Blank.* Stanford University, California: Stanford University Press.

[2] A list of the references to this literature will be found in the following: Strong, Edward K., Jr. *Change of Interests with Age.* Stanford University, California: Stanford University Press.
Manual for the Vocational Interest Blank. Stanford University, California: Stanford University Press.

[3] Segel, David. "Differential Prediction of Ability as Represented by College Subject Groups," *Journal of Educational Research*, XXV, January and February, 1932.

boys was used. These boys at the time of entrance to junior college filled out the Strong Vocational Interest Blank and at the time were given the Iowa High School Content Examination and the American Council on Education Psychological Examination. At the end of the year the marks for different subject groups were compiled. The scores for occupational interest were reported for some twenty-two occupations. The scores were recorded as A, B+, B, B— and C. This classification of scores was made before this study was planned. It would have been advantageous to have had the new scores because of the slight increase in the size of the correlation coefficients and because the linearity or non-linearity of the data would have been shown better.

Out of the twenty-two occupational scores, six were selected from a careful inspection of the distribution of the scores as having possibilities to be investigated. These were engineering, medicine, law, life insurance, personnel management, and purchasing agent. This selection was checked against Strong's[4] suggestions and the intercorrelations between the tests. He suggests that if it is not economical to score the blank for all the occupations that the blank be scored first for engineering, medicine, lawyer, advertiser, life insurance salesman, certified public accountant, personnel manager, school teacher, and purchasing agent. He believes these represent the widest range of occupational interest.

The intercorrelation coefficients between the six selected interest scores, the correlation coefficients between the six interest scores and the scores on the different parts of the Iowa High School Content Examination and the total score on the American Council on Education Test, and the correlation coefficient between the interest scores and college marks in English, language, history and mathematics and science are given in Tables I, II, and III. All coefficients were calculated by the product-moment method and are not corrected for attenuation.

The results given in Table II show some very definite relationships between the interest scores and achievement in different academic fields. Interest scores in engineering are associated significantly with achievement in mathematics and science. Interest scores in medicine are also definitely associated with achievement in mathematics and science. Interest scores in life insurance salesmanship are related to a lack of achievement in mathematics and science. Purchasing agent interest scores are

[4] *Manual for the Vocational Interest Test.* Stanford University, California: Stanford University Press.

TABLE I

INTERCORRELATION COEFFICIENTS BETWEEN INTEREST SCORES ON THE STRONG INTEREST BLANK (100 CASES)

	Engineering	Medicine	Law	Life Insurance	Personnel Management	Purchasing Agent
Medicine	+.62					
Law	—.06	+.35				
Life Insurance	—.46	—.31	+.20			
Personnel Management	—.32	—.46	—.18	+.06		
Purchasing Agent	+.16	—.18	—.21	+.08	+.10	

TABLE II

CORRELATION COEFFICIENTS BETWEEN CERTAIN VOCATIONAL INTEREST BLANK SCORES AND THE FOUR PARTS OF THE IOWA HIGH SCHOOL CONTENT EXAMINATION AND THE AMERICAN COUNCIL ON EDUCATION PSYCHOLOGICAL EXAMINATION (100 CASES)

	Strong Interest Scores					
	Engineering	Medicine	Law	Life Insurance	Personnel Management	Purchasing Agent
Iowa A English Literature	—.10	—.11	+.09	—.04	+.10	—.43
Iowa B Mathematics	+.49	+.28	—.03	—.27	—.15	+.04
Iowa C Science	+.36	+.29	—.01	—.29	—.17	—.26
Iowa D History and Social Science	—.16	—.05	+.09	+.08	+.04	—.26
Psychological Examination	+.10	—.02	.00	—.12	—.08	—.32

TABLE III

CORRELATION COEFFICIENTS BETWEEN CERTAIN VOCATIONAL INTEREST BLANK SCORES AND FIRST-YEAR COLLEGE MARKS IN ENGLISH LANGUAGES, HISTORY AND MATHEMATICS AND SCIENCE

		Strong Interest Scores					
	No. of Cases	Engineering	Medicine	Law	Life Insurance	Personnel Management	Purchasing Agent
English Languages	89	—.10	—.08	+.04	—.15	—.14	—.22
Mathematics and Science	86	—.09	—.01	.00	+.01	—.07	—.14
History	93	+.14	+.06	—.22	—.22	—.01	—.02
	53	—.47	—.13	—.10	—.05	+.27	—.17

associated with lack of achievement in English literature, science and history and social science. Interest scores in law do not seem to be associated very definitely with achievement or lack of achievement in any of the fields tested by the Iowa test. Intelligence as expressed by the American Council on Education Test has little or no relation to the various vocational interest scores except those of purchasing agent.

The relationships discussed were found between measures obtained at the same time—at the beginning of the junior college course. Insofar as achievement is predictive of itself these relationships may be considered between the Strong scores and the Iowa scores as predictive.

The correlation coefficients given in Table III between the vocational interest scores and first-year marks in certain subject groups are not significant in most cases. About the only significant relationships are those between engineering interest and history marks (correlation coefficient of —.47). The signs of the coefficients insofar as we can judge by inspection of what should be the relationships are in the right direction.

All the evidence taken together shows that interest questionnaires designed for use in vocational guidance may also be useful in educational guidance. The relationship of the scores with college marks is quite low. This in large part, however, is due to their lack of reliability and because of other factors taken into account by teachers in marking. If the correlation coefficients were to be corrected for attenuation for both the interest scores and marks the coefficients would be higher. We do not have the data at hand to make such corrections. The correlation of the interest scores, however, with the tests in practically the same academic subjects shows the effect, in part, of increased reliability of the success criterion.

Many colleges use these tests for the purpose of vocational guidance. To use such tests for educational guidance in addition is therefore an economical procedure. As measurements of results in colleges are used more and more the relation between these scores and success in the various subjects will become more clear.

Since interest scores based upon a relationship with an occupation have been shown to have definite relationships with different college subjects when achievement tests are used, it seems that scales for scoring the Strong Interest tests should be devised for the principal subject groups in higher secondary education. It would seem logical to think that if interest scores based upon a criterion (such as the occupational criterion) has some relationship with academic success that interest scores obtained from a scale made directly for a criterion (such as success in academic subject) will have a greater relationship.

STUDY OF THE GAINS MADE BY NORMAL-SCHOOL STUDENTS IN INTELLIGENCE TEST SCORES

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THE State Normal School at Bellingham, Washington, has for a number of years administered entrance tests. Among these, during the past six or seven years, has been the Thorndike Intelligence Examination for High School Graduates. The complete Thorndike Examination, however, has not been used. Until October, 1930, two forms of Part I were given to each entering student, and the scores on the two forms were combined into a total score which was termed "College Aptitude Rating." Since October, 1930, only one form of part one has been used. In addition to the Thorndike Examination, six achievement tests have been given to all entering students.

The scores made on the Thorndike tests are interpreted in terms of the entire entering group. A new distribution is made each fall, based upon the scores made by the group entering that fall. A study of these distributions made in successive years shows no significant difference from year to year in the central tendency and variability of the groups.

In May, 1930, 125 students who had entered at the beginning of the fall quarter of 1928 and who were candidates for graduation from the two-year normal course in June, 1930, were given the same forms of the Thorndike Examination and either the same form or an equivalent form of the achievement tests which they had taken upon entering the institution. The students were informed only a week-end beforehand that the entrance tests were to be taken again. This was done as a precaution against special preparation. The results of the gains made in the achievement tests have been reported elsewhere[1] and will be referred to later in this article. This procedure was duplicated with the group which entered the Normal School in October, 1929, and graduated in June, 1931.

The Thorndike Examination was given in January, 1932, to a group of 125 students, selected alphabetically, who had entered as regular freshmen in October, 1931, and who had taken the Thorndike Examination

[1] Upshall, C. C., and Masters, Harry V. *Analysis of the Gains Made in Certain Objective Tests by Normal School Students during the Two-Year Period of Their Attendance.* Bureau of Research Studies, No. 11. Bellingham, Washington: Washington State Normal School.

during the first week of the fall quarter. This group was given notice two days in advance of the retest to report at a specified time and place, but they were not told what test they were to take.

It is the purpose of this discussion to analyze in detail the gains made in the Thorndike Intelligence Examination for High School Graduates, Part I, at the end of one quarter and of six quarters. This study answers the following questions:

1. Does a normal-school student's score on the Thorndike Examination remain practically constant?
2. Is the score on an intelligence test for college students much less influenced by the effect of normal-school attendance than the score on subject matter tests?
3. If an increase is made on the Thorndike Examination during a two-year period, to what degree is it related to chronological age?
4. If test-wiseness, calmness of emotion, strong motivation, etc., are found to have a tendency to increase the score on the Thorndike Examination, do they account for the total gain?

Table I gives the means, standard deviations, differences between means, probable errors of means and of the differences between means and the correlation for two sets of scores for each of the three normal-school groups on the Thorndike examination. Group A in the table represents 125 students who took the Thorndike test upon entering the Normal School as freshmen in October, 1928, and who took the test again in May, 1930, two weeks before their graduation from the two-year course. Approximately six full quarters of normal-school work were taken by this group between the two tests.

Group B represents 113 students who took the Thorndike Examination upon entering the Normal School as freshmen in October, 1929, and who took the test again in May, 1931, two weeks before their graduation from the two-year normal-school course. Approximately six quarters of normal-school work were taken by this group between the two tests.

Group C represents 125 students who took the Thorndike Examination as freshmen in October, 1931, and who took the Thorndike Examination again the first part of January, 1932. This group took one quarter's work between the tests.

From the data given in Tables I and II, it is seen that the gains made by each of the three groups are significant. In Group A the gain is 28 times its probable error, in Group B the gain is 26 times its probable

TABLE I

MEANS, STANDARD DEVIATIONS, DIFFERENCES BETWEEN MEANS, PROBABLE ERRORS OF MEANS AND OF THE DIFFERENCES BETWEEN MEANS, AND VALUE OF r FOR THE TWO SETS OF SCORES FOR EACH OF THREE NORMAL-SCHOOL GROUPS ON THE THORNDIKE INTELLIGENCE EXAMINATION FOR HIGH SCHOOL GRADUATES

		Mean	Standard Deviation	r
Group A ($N = 125$)				
Six quarters between tests	Oct., 1928, scores	118.31 ± .55	9.02	
	May, 1930, scores	127.96 ± .51	8.40	.80 ± .02
	Difference	9.65 ± .34		
Group B ($N = 113$)				
Six quarters between tests	Oct., 1929, scores	117.65 ± .55	8.70	
	May, 1931, scores	126.60 ± .48	7.50	.78 ± .02
	Difference	8.95 ± .35		
Group C ($N = 125$)				
One quarter between tests	Oct., 1931, scores	114.34 ± .56	9.24	
	Jan., 1932, scores	117.90 ± .60	9.89	.70 ± .03
	Difference	3.56 ± .45		

TABLE II

DIFFERENCES IN GAINS WITH THEIR PROBABLE ERRORS

	Gain		Gain		Gain
Group A	9.65 ± .34	Group B	8.95 ± .35	Group A	9.65 ± .34
Group C	3.56 ± .45	Group C	3.56 ± .45	Group B	8.95 ± .35
Difference	6.09 ± .56		5.39 ± .57		.70 ± .49

error, and in Group C the gain is 8 times its probable error. In Group A and Group B the means on the test taken just prior to graduation were more than a sigma distance above the means of the test when taken upon entrance. In Group C the mean of the test taken in January was a little more than one-third of a sigma distance higher than the mean of the test when taken the previous October. From these data, there can be no doubt that the gains made on the Thorndike Examination after one and after six quarters' attendance at normal school are large and significant.

The differences between gains are given in Table II. The difference in gains made by Group A and Group B was about one and one-half times its probable error and cannot be considered significant. The difference in gains made by Group A and Group C was approximately eleven times its probable error and the difference between Group B and Group C was approximately nine times its probable error.

It seems reasonable to suppose that at the beginning of the second quarter students have become fairly well adjusted. They have had twelve weeks in which to become adjusted to school routine; they have taken many tests of an objective nature; they have become acquainted with a number of students and some faculty members. The motivation given was made as similar as possible to that given the other two groups at the end of six quarters. Lack of general adjustment to the normal-school

situation, test-wiseness, calmness of emotion and strong motivation which might unfavorably influence the score made during the first week are most likely as influential in affecting scores made on a retest taken after one quarter as scores made on a retest taken after six quarters. If the entire gain made after one quarter could be attributed to the factors of adjustment mentioned (which is unlikely), approximately only one-third of the gain made after six quarters could be accounted for. At least two-thirds of the gain made during six quarters is not due to such factors as test-wiseness, calmness of emotion, and strong motivation.

The gains made in the Thorndike Examination by each of the three groups were studied in light of the amount of time elapsing between high-school graduation and entrance to normal school. Those who entered normal school within one year after high-school graduation made gains, as a group, which were not significantly different from the gains made by those who did not enter normal school until one or more years after graduation from high school. The correlation between gain on the Thorndike after six quarters' attendance at normal school and age of entrance (Group A) is .10 ± .06. The correlation between gain on the Thorndike test after one quarter's attendance at normal school and age of entrance (Group C) is .01 ± .06. These correlations indicate that age at entrance to normal school plays very little if any part in determining the amount of gain made on the Thorndike test after one and after six quarters' attendance.

Table III gives, for each of the three groups, the distribution of gains made between the first and second tests in terms of sigma distances on the original test. This table should be read: "In Group A, two percent of the students received scores on the second test which were between

TABLE III

DISTRIBUTION OF GAINS MADE BY THE THREE GROUPS IN TERMS OF SIGMA DISTANCES

	−2	−1½	−1	−½	0	+½	+1	+1½	+2	+2½	+3
Group A (N=125) Six quarters between tests		0	0	2	11	28	32	21	6	1	
Group B (N=113) Six quarters between tests		0	0	1	6	39	33	12	8	1	
Groups A and B combined		0	0	1	9	33	32	17	7	1	
Group C (N=125) One quarter between tests		2	3	11	26	28	18	8	2	0	

one-half and one sigma distance below their scores on the first test; eleven percent of this group received scores on the second test which were within one-half sigma distance of their scores on the first test, etc."

When Groups A and B are combined, one-third of those who graduated made scores on the second test which were one-half to one sigma distances above their scores on the first test. Another third made scores on the second test which were one to one and one-half sigma distances above their scores on the first test. Ninety percent of the 238 who graduated (Groups A and B combined) made scores on the second test which were one-half sigma or more above their scores on the first test. In Group C, only fifty-six percent made scores on the second test which were one-half sigma or more above their scores on the first test.

In studying the gain made on the Thorndike Examination, it is profitable to compare with it gains made on some subject matter tests. Group A, as mentioned earlier, took at the end of six quarters the same tests in several subject-matter fields that they took when entering the normal school. Gains made in these tests have been reported in detail in a study referred to previously. One table is presented here since it offers data which aid in interpreting the gains made on the Thorndike Examination.

TABLE IV

COMPARISON OF THE MEANS AND SIGMAS OF THE TEST SCORES MADE BY ENTERING NORMAL-SCHOOL STUDENTS AND THOSE MADE BY THE SAME GROUP OF STUDENTS TWO YEARS LATER

Name of Test	Group	Mean	Difference between Mean of 1930 Test and Mean of 1928 Test*	Gain / Sigma (1928)	Diff. / P.E. diff.	Sigma
Thorndike	1928	118.31	9.63 ± .33	1.07	29	9.02
	1930	127.94				8.40
Arith. Reas.	1928	13.22	2.54 ± .18	.76	14	3.34
	1930	15.76				2.73
Arith. Comp.	1928	22.78	3.70 ± .20	.70	18	5.31
	1930	26.48				4.22
English usage (No. of errors)	1928	36.19†	3.69 ± .66	.26	6	14.35†
	1930	32.50				9.56
History	1928	76.79	17.09 ± .75	.96	23	17.83
	1930	93.88				20.10
Geography	1928	58.06	10.39 ± .57	.68	18	15.25
	1930	68.45				17.28

* All differences are in favor of the 1930 tests.
† The scores for this test are given in terms of the number of errors.

Table IV shows that in terms of the standard deviation of the tests given in October, 1928, the greatest gain was made on the Thorndike

Examination. History was a close second, but in none of the others was the average gain more than three-fourths that which took place in the Thorndike Examination. In English usage the gain was only one-fourth that of the Thorndike Examination.

CONCLUSIONS

Question 1: Does a normal-school student's score on the Thorndike Examination remain practically constant?

Answer: No.

Question 2: Is the score on an intelligence test for college students much less influenced by the effect of normal-school attendance than the score on subject matter tests?

Answer: No. The gain on the Thorndike Examination is greater than that on any of five achievement tests used.

Question 3: If an increase is made on the Thorndike Examination during a two-year period, to what degree is it related to chronological age?

Answer: A significant increase in score is made. The correlation between gain made and age at entrance to normal-school indicates that age plays very little if any part in determining the amount of gain made.

Question 4: If test-wiseness, calmness of emotion, strong motivation, etc., are found to have a tendency to increase the score on the Thorndike Examination, do they account for the total gain?

Answer: Assuming these factors to influence the scores made at the end of six quarters as much as the scores made at the end of one quarter, not more than one-third of the gain made during six quarters can be attributed to them. They do not account for the total gain.

Numerous studies have been made showing that there is but very small growth of native intelligence after the age of 16.[2] The average age of the students in the groups used in this study was 18 when the first test was taken. Therefore, very little or no gain should be made by this group during the succeeding two years on a test which is a valid

[2] Pintner, R. *Intelligence Testing: Methods and Results* (New York: Henry Holt and Company, 1931), pp. 76-91.

test of native intelligence. This study shows, however, that: a gain was made on the Thorndike Entrance Examination for High School Graduates, Part I, by 92 percent of the 238 students tested after a two-year period; this gain was not related to age; it can be accounted for in part only by greater test-wiseness, calmness of emotion, greater motivation, etc.; and the gain on this test was greater, when made comparable, than the gains made on tests given in arithmetic reasoning, arithmetic computation, English usage, history, and geography.

The Thorndike Examination has been found useful in predicting success in college and the data here presented in no way affect the value of the test for this purpose. The facts revealed by this study, however, do support the conclusion that the Thorndike Intelligence Examination for High School Graduates, Part I, is not a valid measure of general intelligence as that term is commonly defined and used.

AN AID FOR IMPROVING READING RATE

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THE purposes of this paper are (1) to present a technique for use in increasing the reading span (average number of words perceived at each reading fixation); (2) to summarize an experiment which validates its use with college freshmen; and (3) to discuss how the technique might be applied to the teaching of reading.

In an experiment[1] to determine various techniques for increasing the reading span of poor readers in college, the following technique was found to be very effective. Selections were typed off into short separated phrases as in the following sample line:

Whether note taking is good or evil

In reading these selections the most efficient way is to make the eyes stop once on each phrase and then to pass on to the next. To make more than one stop introduces a jerky and tiring sequence of fixations much like the pace of a person walking poorly spaced railroad ties. At the beginning of the training the number of words in each phrase was small enough to allow even the poorest readers to assimilate a group in one fixation. As improvement took place, the length of each phrase was gradually increased until material such as the following line was used:

For the reader of your paper to know what you have read

Also as the training progressed, more and more reading from normally printed material was interspersed between these exercises. Outside the training periods the students were told to practise reading at their best rate.

At the end of ten weeks of such training, the following reliable gains were found: Rate of reading as measured by four tests had increased 58 percent and comprehension accuracy had shown a small gain (5 percent). The analysis of the eye movement records showed that such gains in rate were due to a 62 percent increase in the width of fixation, a 5 percent reduction in duration of fixation, and a 67 percent reduction in the number of regressions. Because of the relative infrequency of re-

[1] Robinson, F. P. *The Role of Eye Movements in Reading with an Evaluation of Techniques for Their Improvement*, University of Iowa Studies, Series on Aims and Progress of Research, No. 39, Iowa City, Iowa: University of Iowa, 1933.

gressions, reading span improvement was the primary cause of the gains in rate.

The study of a matched control group showed that maturation would not account for the gains found. The analysis of the gains of another matched group given training in comprehension showed that they were entirely different from those due to the technique described above. The possibilities of skimming and experimental adjustments causing the gains were found not to be operative. The monograph[2] also discusses the psychological realm of this improvement but the point of interest here is that such training does very markedly improve the reading rate of college freshmen.

The question then arises if such a procedure might be of use in the earlier grades while reading is being learned. Certainly such marked gains would not be found. Poor freshmen readers are usually capable in every other way of reading faster but do not do so because of certain inhibiting habits. Thus when good habits are substituted, marked improvement can take place. Certain of these training results, however, indicate that a modified form of the technique might be feasible for use in the early training of reading. The most important modifications would be to reduce the phrase size, even down to single words in many instances, during the training to increase the size of the phrasing much more slowly; and to use sense combinations, such as adjective-noun, adverb-verb, etc., as much as possible in this phrasing. In separating the material into phrases, they need not have the same number of words, but should be determined by the length and difficulty of the words. A transition to more difficult phrases can be built up gradually by introducing a little more difficult phrases from time to time and in increasing numbers. The rhythm of the eye movements will carry the child over the phrase without an extra pause.

If such a technique were used, the following results might be expected: (1) improvement in perceiving words and phrases at a glance (reduced number of reading fixations), and (2) an improved eye movement rhythm (constant forward movement of the eyes with few fixations of long duration). This tendency of the technique to emphasize a given directional sequence might aid in orienting the group of children which Orton[3]

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[2] Robinson, F. P. *Op. cit.*

[3] Orton, S. T. "The 'Sight Reading' Method of Teaching Reading as a Source of Reading Disability," *Journal of Educational Psychology*, XX (1929), pp. 135-143.

claims are lost through the present methods of teaching reading because they get mixed up in sequence and reverse many symbols.

Portions of elementary readers could be printed in this manner. At any point of increasing the difficulty of the phrases the exercises should be increased in number, but as the skill is developed, normally printed material should be used more. The application of this technique to the teaching of beginning reading is merely a suggestion and awaits validation at this level.

EDITORIAL

THE PROBLEM OF ADEQUATE EDUCATIONAL EQUIPMENT FOR SCHOOLS

HAS RESEARCH DETERMINED EITHER THE LIMITATIONS OR THE POSSIBILITIES OF SCHOOL EDUCATION FOR EACH SCHOOL YEAR?

For at least a dozen years research methods have been used, often in nation-wide programs of investigation, to determine the educational attainments of pupils in subject matter for each school grade with present equipments. A number of these programs have been repeated from year to year. What are the facts found for the general situation? Little has been done to analyze the results for individual pupils.

An interesting fact is that the median score for no school subject in any of the states differs from the national median by more than a half of a school year-grade and for most of the subjects by not more than a quarter of a school year.

Another interesting fact is that the rural and small town schools have a median score not more than two or three months lower than the national score on six school subjects, and they have on the subjects of geography, nature study, and health a definitely higher median than the cities. The city school pupils make higher than the national median score in reading for the grades up to the seventh, and the city median for reading in some of these grades is nearly a half-year higher than the median for small town and country schools.

These facts in themselves do not give much of an answer to the problem of adequate educational equipment for schools. They do indicate, however, that so far as our present textbook use is involved, attainment is practically uniform for the country as a whole, and as between city and country schools. Though textbooks are not uniform, the different publishers maintain a curriculum covering the text material in the subjects and make a like adjustment of its presentation in the different grades. This enables all schools to make a common median attainment. This fact may be accepted, since the makers of survey tests have made sure of the validity of the questions used, to give an adequate sampling of the attainment in each subject.

The derived fact indicated by this uniformity of the median progress made by all schools is that school education at this time is the effect of a practically uniform exposure of all pupils to subject matter content by which the pupils attain in each case an education proportionate to the mental age ability of the pupils. What is done in general by the teachers is to provide for this uniform exposure.

Another derived fact comes from the relation, indicated by the testing programs, between the country schools and the city schools, showing a higher attainment by rural pupils in the subjects of geography and nature study, and a higher attainment by city pupils in reading. This derived fact indicates the value of natural environment for rural children above the school equipment that city schools may have for supplementing the textbooks in geography and nature study; and for the city schools, the value of the almost continuous exposure to reading opportunities.

These facts are, in a sense, negative as to educational possibilities, for they indicate, as might have been anticipated, that subject matter instruction is definitely limited by the median of natural mental capacity. They do not, apparently, give any hint with regard to a strengthened mental character due to the intellectual and civic training given by able teachers in those schools which are well equipped for an instruction not covered by textbooks. If an environment in the cities of advertising reading matter and newspapers on every street corner and a flood of exciting literature in every soft-drink drugstore will raise the scores on a reading test, and also, a nature environment in the country of geographic contours and soil products will raise the scores of rural school children on geography and nature study tests, then there is reason to expect strengthened civic and social abilities from able teaching and adequate equipment in any school organized for creative work in artistic and dramatic expression coöperatively carried out.

Our survey tests do measure, to a limited extent, the breadth of attainment possible at different levels of mental ability. If they did not, then no definite difference would have been found between the scores of city and country children. But to fully measure the results of the teachers' definite work for individual breadth of attainment of pupils requires tests that check instruction in a way to determine definite pupil difficulties as they are met. Such tests are the tools by which to determine the limitations and perhaps the possibilities of school education.

REPORTED BY AN OBSERVER

G. A. B.

REVIEWS

Address all communications relative to book reviews to Editor Kai Jensen, University of Wisconsin, Madison, Wisconsin.

WEBB, L. W., CLEMENT, J. A., DEAM, T. M., DAVIS, C. O., FOSTER, J. E., WILLETT, G. W., AND WILLING, M. H., EDITORS. *High School Curriculum Reorganization* (Ann Arbor, Michigan: The North Central Association of Colleges and Secondary Schools, 1933), pp. vii + 395.

It is widely realized that secondary education is in a backward condition. As a consequence, its leaders for many years have been active in attempts to improve its program. One of the most serious of these attempts has been made by the North Central Association's Committee on Standards for Use in the Reorganization of Secondary School Curricula. This committee, with a subcommittee for each high school department, began its work more than twelve years ago. The present volume brings together in concise and convenient form the substance of the numerous reports of the several committees as published in scattered form from 1924 to 1932.

The volume has two values: (1) It explains briefly, and exemplifies in all of the reports, the curriculum philosophy of the committee; and (2) the several departmental reports present a large number of specific suggestions that can be of service to teachers in their practical curriculum-planning.

The committee takes the sound position that the first step in improving the high-school curriculum is to make definite the total educational result that is to be achieved by the high-school pupil. This result, as they conceive it, is fourfold: (1) ability to maintain physical fitness; (2) ability to use leisure time wisely; (3) ability properly to co-operate socially; and (4) competence in vocation. Each of these abilities is then analyzed into its constituent factors and sub-factors.

The second step, but one that is called into question by the committee itself in its final chapter, is to assume that the means of achieving the results is to teach the well-known high school subjects, from art to vocation, merely improving them where they can be made to produce a larger quota of the total good result aimed at. The work of each subcommittee then is to take up each of the specific objectives and to specify the subject-matter of their field that will best subserve that purpose. The plan gives full opportunity to the most useless subjects to incorporate their standardized rationalizations and to formulate programs that are made to appear to the usual innocent type of program-maker not only serviceable but also needful, even indispensable, for arriving at the approved objectives. Because of the fact that the subjects of little use are on the defensive they are motivated to the larger effort in building full programs and surrounding them with all the aura of plausibility that they can muster. So zealous and skillful are they, even the discerning skeptic is half-convinced.

It would seem that the plan ought to give the best opportunity to the protagonists of the most useful subjects to show their superior values and to present a program so convincing that it would automatically push out the needless subjects. If it does not do so, the committees have not taken full advantage of their opportunity. They are perhaps hindered in two ways: (1) knowing the vital need of their subjects, not feeling that they are forced to justify them, they have not always worked with a zeal commensurate with the values; and (2) the objectives laid out by the general committee, when reduced to their factors, are in the familiar academic terms of abstract knowledge, techniques, habits, skills, ideals, attitudes, and appreciations rather than in the concrete and current activities of actual daily living by variously dispositioned and circumstanced human beings. The academic objectives do not give the indispensable portions of the needed present-day program their proper opportunity.

One of the major efforts of the general committee has been to avoid the academic fallacy and to set up the objectives in terms of human living; that is to say, to do the very thing which we say they have not done. Their philosophy is undoubtedly correct. And it is obvious that their interpretations was a distinct contribution to curriculum theory seven years ago when it was first formulated. But since that time the theory has advanced much beyond that point. For that reason their statement of educational objectives is now of only historical interest. The entire volume is built upon this obsolescent series of objectives. The reports of the sub-committees assemble numerous excellent suggestions relative to units, topics, and readings; but outside of those, their reports today will only mislead the high school curriculum planner.

FRANKLIN BOBBITT
University of Chicago

ZUBIN, JOSEPH. *Some Effects of Incentives: A Study of Individual Differences in Rivalry.* Contributions to Education, No. 532 (New York: Bureau of Publications, Teachers College, Columbia University, 1932), pp. vii + 60.

The aim of this study was to measure the effect of rivalry upon efficiency in the performance of simple tasks. Following a preliminary experiment which was carried out for the purpose of testing the experimental procedure, a total of 217 children in grades 6, 7, and 8 in a New York City public school were used as subjects for the main study. Two classes from each grade were tested. One class served as the experimental group, the other as a control group working under non-incentive conditions.

Speed of addition and comparison of numbers (same or different) were the tasks employed.

The incentive used was rivalry between closely matched individuals and the promise of a reward to each child who succeeded in surpassing the performance of another who previously out-ranked him. After a one-minute practice period a contest was held to determine the order of merit of the different children in the group. Children were told that after the papers had been marked each would be assigned a rank according to his standing in the class. A second contest then followed in which the rivalry motive was introduced. The children were told that a prize would be given to each child who succeeded in beating the one who formerly stood just above him. The child

who originally ranked first would also receive a prize if he maintained his place. A second practice period without incentive followed, then another contest period, and so on for eleven consecutive periods. Each period was one minute in length. To insure against the operation of the rivalry factor during the practice periods, children were instructed not to write their names on the practice sheets.

When no incentive was used the final composite speed (arithmetic plus comparisons) showed a sign of 6.9 in score over the initial period. This gain is presumably to be attributed to the effect of practice and "warming-up." The final composite speed when the rivalry incentive was introduced shows an increase of 12.4 over the initial speed which is 5.5 units greater than that occurring when no incentive was used. The difference between the gains under the two conditions is 16.5 times its probable error. That the rivalry motive has a significant effect upon the performances studied seems to be reliably established.

There was a slight association between school grade and gain under incentive conditions, the pupils of the higher grades making, on the average, somewhat greater gains than those of the lower grades. A more definite association was found between gain and age-grade status. Children who were accelerated in school responded to the incentive used more strongly than those who were retarded. In this we have a further confirmation of the importance of motivation in determining school progress.

FLORENCE L. GOODENOUGH
University of Minnesota

MONROE, PAUL. *Essays in Comparative Education: Republished Papers*, Vol. II (New York: Bureau of Publications, Teachers College, Columbia University, 1932), pp. viii + 311.

A literary critic has suggested that all books can be divided into three large classes. One class is descriptive of facts with no ideas or theories drawn from the facts, and is, therefore, not as fertile and creative a cultural influence as otherwise it might be. Another is speculative and more or less frankly neglectful of facts, and is, as a result, not fully fertile either. The third and superior class of books is attentive to facts, which then are subjected to analysis that yields ideas leading to the creation of better, more enlightened, and more beneficent facts.

Dr. Monroe's *Essays in Comparative Education* undoubtedly belongs in the latter class. And if it is true of some books that book is man, it is certainly true of these *Essays*. The numerous American and foreign students of this distinguished American teacher scattered over the world, many of whom occupy high and responsible positions in their respective countries, will while perusing the *Essays* recognize the master's unmistakable voice. Full of serene wisdom and real human sympathy for the educational and cultural problems of the various countries, it speaks from the pages of the *Essays* with the unostentatious but unparalleled authority of a thinker and scholar who has been a keen student of many civilizations for many *lustra*.

The entire world is Dr. Monroe's field of research. Nothing of importance, from the far-reaching changes which Russia has been undergoing since the establishment of the Bolshevist dictatorship to the "Mosaic which is Manchuria," has escaped the statesman-like eye of Dr. Monroe, who has studied at first hand every subject discussed in the *Essays*. Many world problems of pro-

verbial recalcitrancy find an edifying adjustment and harmony in the salubrious atmosphere of the *Essays*. East and West not only meet there, but look at one another with understanding and appreciation without at all losing their mutually valuable peculiarities. Especially significant in this regard are the chapters: "On American Educational Institutions Abroad" and "What Educators of the West May Learn from the Recently Organized Educational Systems of the East."

As is fitting for an international philosopher and scholar who is also a loving son of his country, his travel around the world brings Dr. Monroe back home to show in the chapter, "Historic Foundations of American Education," how, indeed, the shortest way to an unshakably solid and clear knowledge of one's own country is a philosopher's travel around the world.

MICHAEL DEMIASHKEVICH
George Peabody College for Teachers

DEVEREAUX, FREDERICK L. *The Educational Talking Picture* (Chicago: The University of Chicago Press, 1933), pp. xiii + 222.

We have here the most comprehensive treatise yet written on the teaching film. In the first several chapters Mr. Devereaux takes the reader behind the scenes and shows him all of the many research problems met with in the production of an educational motion picture. So effectively is this accomplished that the book may well serve as a guide to producers of educational motion pictures. The author discusses such topics as: the selecting of fields for talking picture presentation, the making of subject matter surveys, preparing the unit of instruction, preparing the continuity, preparing the study guide, and writing the scenario. He points out the need for adequate curriculum research as the basis for the selection of topics and objectives and he describes the work of the research specialist in the various stages of the production of the teaching films. In an authoritative manner he treats of the technical aspects of the film production and of the standards for evaluating or appraising the educational sound motion picture.

The book contains an excellent summary and appraisal of the various studies in the field of educational sound motion pictures with suggestions for future experiments and research.

Several chapters deal with the utilization of the sound motion pictures in elementary and secondary schools, in colleges and universities, and in adult educational work. Valuable suggestions are also given for administering a program of audio-visual instruction, including recommendations for school-building and equipment facilities.

Although an excellent book, and one that should be in the hands of all persons interested in the production of motion pictures or in the administration of their use, it is marred by the author's only too obvious attempt to promote the sound motion picture. The impression is left that the sound motion picture, as distinguished from the silent teaching film, has a monopoly on all that is good in teaching films. All through the text the implication is made, without actually stating so, that all of the devices and refinements which make the motion picture so effective as a teaching aid are found only in the sound motion picture, as witness the following:

"What are the contributions of the sound picture using animated drawings, slow motion, time-lapse photography, micro-photography, and the like, in add-

ing to the clearness of the work which can ordinarily be done with mechanical devices? The adapting of the contributions of the sound pictures to the educational process, however, is only in its beginnings. The opportunities for investigating and building up effective instructional techniques should intrigue the creative teacher who understands clearly the contributions of the sound picture in helping to overcome the physical limitations of the classroom and the laboratory."

All of the above devices are found where needed in the many excellent silent teaching films now available. In fact, these devices were developed and used effectively in the silent teaching films before they were used in sound motion pictures. Again, in another chapter we read:

"The introduction of the use of the talking picture into education may prove to be an event as epochal as the application of the principle of the wheel to transportation or the application of steam power to the industrial age. No development in education since the coming of the textbook has held such tremendous possibilities for increasing the effectiveness of teaching as educational talking pictures, produced and used so as to attain their potentialities."

The value of the book would have been much enhanced had the author more clearly differentiated between sound motion pictures and silent motion pictures in his discussion and had he defined the actual difference between the two, giving the advantages and disadvantages of each and their place in the teaching program.

None-the-less it is a book that deserves a place in the library of everyone who is interested in the possibilities of educational motion pictures, be he producer, school administrator, or teacher.

JOHN E. HANSEN
University of Wisconsin

FEATHERSTONE, WILLIAM B. *The Curriculum of the Special Class: Its Underlying Principles.* Contributions to Education, No. 544 (New York: Bureau of Publications, Teachers College, Columbia University, 1932), 157 pp.

In this monograph the author has very ably reviewed a discussion of the principles underlying the curriculum of the special class for backward pupils. His discussion is not limited to the special class but is presented with reference to the entire educational program. He presents the possibilities and limitations of the traditional and progressive methods of education as applied to normal children and suggests their implications for the mentally subnormal.

Throughout the entire treatise he urges a progressive point of view in which growth in the social processes is paramount to mastery of subject matter. He points out a very practical danger of removing all types of handicapped children from the regular grades to such an extent that those responsible for the education of the average will not feel the need of departing from the traditional for the rank and file of everyday pupils. We read between the lines that he advocates a return of these pupils to the regular grades for this purpose and, also, to focus the attention of educational thinkers upon their problems. In rejoinder, it may be suggested that in communities where such mixing is still in vogue that the results which he wishes have also fallen short of accomplishment. There seems to be greater hopes in segregating

enough of these pupils to bring their problem to the attention of the educational philosophers.

In chapter 7 he presents an analysis of some of the literature on the curriculum of the special class and calls attention to the inadequate curricula for such classes. It is unfortunate that at least three major sources of such literature which are available are not mentioned in his discussion.

This monograph is very timely and the discussions are well-formulated and the needs of better curricula for subnormal children are more evident.

HARRY J. BAKER
Detroit Public Schools

ALMACK, JOHN C., EDITOR. *Modern School Administration: Its Problems and Progress* (Boston: Houghton Mifflin Company, 1933), pp. viii + 382.

Modern School Administration is a recent volume devoted to the consideration of problems and progress in public-school administration as viewed by twelve representative writers. It is dedicated to Elwood P. Cubberley and was presented to him at a dinner given in his honor at the close of the current academic year on the occasion of his retirement from active service as the Dean of the School of Education and Professor of Educational Administration at Stanford University.

The volume contains an Introduction by William John Cooper giving an appraisal of the influence of Professor Cubberley on Public Education in the United States and his major contributions to Educational Administration, twelve chapters treating important problems in public-school organization, administration, and supervision, and a concluding chapter which presents a biographical sketch of Professor Cubberley. The several chapters present treatments of varying degrees of comprehensiveness, although the majority can be characterized as general and as representing the special interests of the contributors rather than fundamental phases of a unified sequence of problems in educational administration. Unity of treatment has been attempted through a single editorship but the purpose has been achieved only insofar as composition and format are concerned.

All students of educational administration can profit from reading the volume, but its chief value will be to public-school officers in the field and to laymen interested in a general treatment of important problems in school organization and administration. Teachers who desire to familiarize themselves with critical issues in school administration as a means of coöperating with administrative officers in creating better understanding between schools and supporting communities and in promoting more wholesome public relations will find most chapters of this book admirably suited for the purpose and Chapter XI especially instructive on the specific problem of interpreting the schools to the public.

Because of the great contribution to public education of the man whose unique professional service this volume is intended to commemorate, it should have a place in the library of every public school.

WILLIAM C. REAVIS
University of Chicago

SELLE, ERWIN S. *The Organization and Activities of the National Education Association: A Case Study in Educational Sociology.* Contributions to Education, No. 513 (New York: Bureau of Publications, Teachers Col-

lege, Columbia University, 1932), pp. vii + 180.

The title of the monograph gives a clear notion of its content. The purpose of the author is "to subject the National Educational Association of United States to sociological analysis and interpretation in the following particulars: (1) its organization, (2) its leadership, (3) its activities and objectives, (4) its relationships to other groups, and (5) its methods of control." The objectives of the study are two-fold: (1) to furnish content for the developing field of educational sociology, and (2) to provide an analysis of the National Education Association that will be of value to its leaders and members and to the leaders and members of educational associations in general. Using the earlier study of Alexander as a basis the present study covers the activities of the National Education Association from 1918 to 1928.

The author has succeeded admirably in achieving both his purposes and his two-fold objective. More than this, he has presented a sample of analytical research method which challenges the attention of all research workers. We need such studies as this occasionally to remind us that all valuable educational research is not statistical. With complete freedom from personal bias the author analyzes the motives and impulses which have been responsible for the procedures of the National Education Association during the period studied. Every leader and every one who aspires to be a leader in the Association should read this monograph. Every member of the association will find food for thought in Selle's study of the social forces that account for the phenomenal growth in membership since 1918. The methods of promotion cannot fail to interest everyone who has anything to promote. Among the motives used as a basis of promotion we find "the wish for public recognition," "the wish for security," "rivalry," "respect for tradition," and "reaction to compulsion."

A reading of the monograph suggests many thought-provoking questions like the following: Is it advisable to urge teachers to join the National Education Association merely to enable the local school to show 100 percent membership? To what exent should teachers be compelled to join? May we expect efficiency from a representative assembly of more than 1000 members who meet each year for a few hours only and who have no continuity of tenure or is such a condition one cause of the criticism of the National Education Association which comes occasionally from the unregenerate? Is it true that the same war psychology which was responsible for the late "noble experiment" in prohibition is also back of the phenomenal growth of the National Education Association? Should the Journal of the Association continue to feature favorable criticism only?

These are only a few of the salient points of interest. While disclaiming all effort to reform the National Education Association the monograph closes with a list of problems suitable for further research and a list of nineteen recommendations which will challenge the thought of all who think seriously concerning our educational problems.

W. J. OSBURN
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RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

CAMMACK, JAMES W. JR. AND OTHERS. *Proceedings of the Tenth Annual Educational Conference*, Bulletin of the Bureau of School Service, Vol. VI, No.2 (Lexington, Kentucky: College of Education, University of Kentucky, 1933), 90 pp.

This bulletin contains papers as follows: program of the tenth annual conference; the work of the Kentucky Educational Commission; aims and functions of the public schools; the public school curriculum; employed personnel; adult education; the education of handicapped children; the work of the Commission from a layman's point of view; administrative organization of the public schools; Kentucky school buildings and grounds; educational costs in Kentucky; and support of education in Kentucky.

CAMPBELL, DOAK S. *Problems in the Education of College Women:* A Study of Women Graduates of Southern Colleges, Field Study No. 6 (Nashville, Tennessee: Division of Surveys and Field Studies, George Peabody College for Teachers, 1933), vii + 79 pp.

This bulletin contains a discussion of the following: a statement of the problem; college women and homemaking; college women and vocations; college women and avocational interests; and considerations involved in curriculum revision.

COVERT, TIMON. *Larger Units for Educational Administration:* A Potential Economy, Pamphlet No. 45 (Washington: United States Government Printing Office, 1933), 43 pp.

The author discusses the state as a unit; the county as a unit for school support; and the township as a unit in which he recommends a larger unit for educacational administration. Bibliography.

EDWARDS, NEWTON, AND OTHERS. "The Legal Basis of Education," *Review of Educational Research*, III (December, 1933), pp. 369-482.

This bulletin contains summaries relating to the following subjects: Federal and state relations to education; the constitutional basis of public education; state administrative organization; district organization and control; administration of local school systems; school finance; school property; tort liability of school districts, officers, and teachers; the legal status of teachers; the legal status of pupils; textbooks and curriculum; and legal aspects of higher education. Bibliography.

HYLAN, JOHN COFFEY. *The History of Secondary Education in York and Oxford Counties in Maine*, University of Maine Studies, Second Series, No. 29, The Maine Bulletin (Orono, Maine: University Press, 1933), 78 pp.

A historical study in which the author discusses: the Latin grammar school;

history of the academy; high school before 1873; the free high school under state aid, 1873-1896; later history of the academy, 1875-1930; and development of the high school since 1896. Bibliography.

MORTON, R. L. *The Organization of State Education Associations*, Report of Educational Council of the Ohio Education Association (Columbus, Ohio: Ohio Education Association, 1933), 31 pp.

The author presents a state to state summary of the situation with reference to the organization of the state education associations: the association headquarters; the associations' employees; membership and views; association meetings; research; publicity; and concluding remarks.

REDIT, EDITH ESTHER. *Teachers' Appraisal of Rural School Supervisors' Work in California*, Department of Education Bulletin, No. 16 (Sacramento, California: Department of Education, 1933), x + 32 pp.

The author presents a questionnaire study of the training and experience of teachers, teachers' evaluation of supervisors' activities, and teachers' reactions to supervisory service. Bibliography.

SMITH, HENRY LESTER, AND OTHERS. *Twentieth Annual Conference on Educational Measurements*, Bulletin of School of Education, Indiana University, Vol. X, No. 1 (Bloomington, Indiana: Bureau of Coöperative Research, School of Education, Indiana University, 1933), 98 pp.

This bulletin contains addresses as follows: "An Experiment in Measuring Changes in Pupil Attitudes Affected by Teaching," by Homer L. Humke; "A Study of Logical Learning in College Classes," by Ernest L. Welborn; "Some Effects of Social Change on the Public Schools," by R. W. Holmstedt; "Making Pupils' Marks in Physical Education More Objective," by Karl W. Bookwalter; "Comparison of Two Methods of Measuring the High School," by Otis Trimble; "An Analytical Study of the Factors Involved in Learning to Appreciate Literature," by Mrs. Johnnie R. Smith; "Special Disability in Reading and Arithmetic," by R. C. Scarf; and "The Story of School Sites," by Forest Ruby Noffsinger. Bibliography.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

KRINER, HARRY L. "Preliminary Report on a Five-Year Study of Teachers College Admissions," *Educational Administration and Supervision*, XIX (December, 1933), pp. 692-696.

The author gives a preliminary report on a five-year study on admissions of State Teachers College, California, Pennsylvania, from which he concludes that the admission officer can best discover those who have the proper traits for teaching success by diagnosing each case individually.

HORTON, BYRNE J. "An Annotated Bibliography of the Supply and Demand of Teachers," *Educational Administration and Supervision*, XIX (December, 1933), pp. 675-691.

The author offers an annotated bibliography of 132 titles on the supply and demand of teachers.

HULL, J. D. "Factors Determining the Per Pupil Cost of Instruction in High Schools," *School Review*, XLII (January, 1934), pp. 40-53.

From a study of the high schools in the state of Missouri which had filed complete annual reports with the superintendent of schools for the year 1925-26 and 1931-32, the author finds that there is a general tendency toward lower costs in 1931-32 than in 1925-26. The chief factor causing the variation between expensive and inexpensive departments appeared to be entirely within the control of the administrators.

PUNKE, HAROLD H. "Migration of High-School Graduates," *School Review*, XLII (January, 1934), pp. 26-39.

From a study of the records 14,369 pupils graduating between 1870 and 1932 from 31 Illinois high schools located in communities with populations of less than 5,000, the author concludes that roughly one-third of the graduates of high schools in the communities studied remained in the school community five or more years after graduation.

EXPERIMENTAL STUDIES OF LEARNING AND TEACHING

ANDERSON, HAROLD E., AND SMITH, RUTH SLOAN. "Motivation of Young Children: The Constancy of Certain Behavior Patterns," *Journal of Experimental Education*, II (December, 1933), pp. 138-160.

This study reports a retest of 102 children tested three years previously on the Chase motivation hand dynamometer in which the authors find significant differences in favor of success-reward, failure-reproof, and failure-punishment over the control-motivation. Other questions are answered.

JERSILD, ARTHUR T., AND HOLMES, FRANCES B. "A Study of Children's Fears," *Journal of Experimental Education*, II (December, 1933), pp. 109-118.

The authors present an analysis of the daily home records of the fears of 54 children, age 6 months to 4 years, and an experimental study of the subject from which they conclude that strange and unfamiliar events, objects, persons, and places outnumbered other situations as the apparent cause of overt signs of fear. Among conditions in which the child often shows fear, apparently as the result of being unprepared to cope with his environment, are loud sounds, displacement and loss of support, sudden and unexpected happenings, and unfamiliar sensory events.

LANGHORNE, MAURICE CURTIS. "Age and Sex Differences in the Acquisition of One Type of Skilled Movement," *Journal of Experimental Education*, II (December, 1933), pp. 101-108.

The author presents a study of the influence of age and sex on the acquisition of skill from which he concludes the rates and limits of improvement from practice increase with chronological age. Boys acquired the particular skill employed in this investigation, the operation of a pursuitmeter, more readily than did girls.

CURRICULUM RESEARCH.

BACHMAN, FRANK P. "Differentiated Curricula for Elementary Teachers," *Educational Administration and Supervision*, XIX (December, 1933), pp. 657-670.

The author presents in this article an analysis of the differentiated curricula for the education of elementary teachers of 48 teachers colleges in 48 states, from which the author recommends a single elementary school certificate.

GARBER, LEE O. "An Analysis of Some Books Used as Texts in Introductory Courses in Education," *Educational Administration and Supervision*, XIX, (December, 1933), pp. 652-656.

In this article the author presents the results of analysis of the content of 11 books used as texts in introductory courses in education, from which he concludes that the introductory course in education in one institution may be totally different from such a course in another institution.

REINHARDT, EMMA. "Distribution of Student-Teachers' Time," *Educational Administration and Supervision*, XIX (December, 1933), pp. 697-701.

The author presents an analysis of the time spent in student teaching in the Eastern Illinois State Teachers College compared with the students in the Maryland State Normal School. The average amount of time devoted to practice teaching by 74 students included in this study was 11 hours and 19 minutes per week.

VOIGTS, HEINRICH. "Das Interesse für die Unterrichtsfächer an höheren Mädchenschulen nach seinem Wandel im letzten Jahrzehnte" (Interest in subjects of instruction at secondary schools for girls as it changed in the last decade). *Zeitschrift für pädagogische Psychologie und Jugendkunde*, XXXIV (October, 1933), pp. 367-372.

In answer to the question "In which two subjects are you most, in which two least, interested?" submitted in 1932 to girls of the upper six grades of Prussian secondary schools, the author finds the following shifts in interests as compared with results of a similar study made in 1924-26: (1) With regard to *positive* interests, the subjects: gymnastics, music, French, geography, and drawing showed an increase in interest, while the subjects: German, natural sciences, mathematics, and Latin showed a decrease in interest; (2) with regard to *negative* interests: geography, drawing, French, and natural sciences decreased, while mathematics, Latin, religion, and history increased their negative interest position. The rank order of subjects under positive interests is as follows: German, history, mathematics and geography, foreign languages and gymnastics, drawing and natural sciences. In general, the author finds that present day instructions seems even more closely associated with actual life than it was formerly; that a considerable development in methodology of teaching has taken place; that teachers are not any longer of the reclusive scholarly type, and that content and form of subjects has materially changed since the previous investigation and also in consequence of the Prussian School Reform in 1925.—Wm. Reitz, Chicago.

CHILD WELFARE, GUIDANCE, AND DEVELOPMENT

LOOFBOUROW, GRAHAM C., AND KEYS, NOEL. "A Group of Problem Behavior Tendencies in Junior High School Boys," *Journal of Educational Psychology*, XXIV (December, 1933), pp. 641-652.

The authors report the application of ten group tests to reformatory inmates and groups of junior high-school boys designated as disciplinary problems, from which the authors derive a final battery known as the Personal Index with a reliability in excess of .90, and a validity of approximately .75.

NEUMANN, GERHARDT. "Untersuchungen über das Verhältnis zwischen Stiefmutter und Stiefkind" (Studies of the relation between stepmother and stepchild). *Zeitschrift für pädagogische Psychologie und Jugendkunde*, XXXIV (October, 1933), pp. 358-367.

An analysis of compositions spontaneously written to the theme "What you know about stepmothers, especially about the relations to your own" of 489 eighth-graders of Berlin-Charlottenburg, 30 (6.1%) of which were actually stepchildren, 16 boys and 14 girls. Fifty percent of the boys and 50 percent of the girls indicated unfavorable; 37 percent of the boys and 43 percent of the girls favorable, and 13 percent of the boys and 7 percent of the girls, indefinite relationships to their stepmother.—Wm. Reitz, Chicago.

MEASUREMENTS, STATISTICS, AND THE METHODOLOGY OF SCIENTIFIC RESEARCH

CALDWELL, FLOYD F., AND MOWRY, MARY DAVIS. "The Essay versus the Objective Examination as Measures of the Achievement of Bi-lingual Children," *Journal of Educational Psychology*, XXIV (December, 1933), pp. 695-702.

From a study of essay and objective examinations given to English speaking Americans and Spanish speaking Americans, the authors conclude that language difficulty operates to penalize the Spanish-American pupils when either the essay or objective type of examination is used as an instrument for the measurement of achievement.

CAPRON, VIRGINIA LEE. "The Relative Effect of Three Orders of Arrangement of Items upon Pupils' Scores in Certain Arithmetic and Spelling Tests," *Journal of Educational Psychology*, XXIV (December, 1933), pp. 686-694.

From an experimental study of the relative effect of three orders of arranging test items the author concludes that the order of arrangement has in general very little effect upon pupils' scores in power tests in problem, spelling, and arithmetic fundamentals.

DAVIS, IRA C. "Is This the Scientific Method?" *School Science and Mathematics*, XXXIV (January, 1934), pp. 83-86.

The author offers a discussion of the scientific method, emphasizing the importance of the understanding of the fundamentals of experimentation as the outcome of laboratory work in science instruction in the high school.

DIAMOND, LEON NORDAU. "The Testing Movement in High School Biology," *School Science and Mathematics*, XXXIV (January, 1934), pp. 39-49.

The author gives a historical account of the testing movement in high-school biology with reference to illustrative tests, from its inception to the present.

JOHNSON, PALMER O. "The Measurement of Outcomes of Instruction Other Than Information," *School Science and Mathematics*, XXXIV (January, 1934), pp. 26-33.

The author does not purport to enter into a discussion of the technical phases of test construction, but rather to point out a few illustrations of tests of certain aspects of functional knowledge taken from junior college science.

LINE, W., AND KAPLAN, E. "Variation in IQ at the Preschool Level," *Journal of Experimental Education*, II (December, 1933), pp. 95-100.

The authors present an analysis of certain data supplied by Miss Wellman from the point of view of the constancy of the IQ and the growth of *g*.

O'CONNOR, JOHNSON, AND FILLEY, MARY E. "A Junior English Vocabulary Test," *Personnel Journal*, XII (December, 1933), pp. 204-212.

This article describes an English vocabulary test for use in junior and senior high schools. Data are presented on the use of the test with some 800 persons.

RICHARDSON, H. D. "Discovering Aptitude for the Modern Languages," Reprinted from *Modern Language Journal*, XVIII (December, 1933), pp. 160-170.

This study describes the use of the Symonds Foreign Language Prognosis Test in which the author finds a correlation of .64 with first semester grades.

ROBINSON, ESTHER W., AND CONRAD, HERBERT S. "The Reliability of Observations of Talkativeness and Social Contact among Nursery School Children by the 'Short Time Sample' Technique," *Journal of Experimental Education*, II (December, 1933), pp. 161-165.

A study of the reliability of the short time sample which was found by split-halves method to range from .95 to .99, and by the agreement between two observers to range from .90 to .95.

TAYLOR, WARD H. "The Meaning of an Average," *Journal of Educational Psychology*, XXIV (December, 1933), pp. 703-707.

The author presents an analysis of certain illustrations from which he concludes that the three classical means, designated respectively as the arithmetic, the geometric, and the harmonic, are really based on the same fundamental idea, that of a uniform rate.

VOTAW, DAVID F. "Graphical Determination of Probable Error in Validation of Test Items," *Journal of Educational Psychology*, XXIV (December, 1933), pp. 681-685.

The author presents a graphical method of determining the probable error of test items in the validation of tests. The appropriate formulae and graphs are given.

NEW TEST

1932 Mental Survey Test, prepared by the Scottish Council for Research in Education. London: University of London Press, 1932.

This Mental Survey Test is designed for pupils of ten and eleven years of age.

MISCELLANEOUS

THURSTONE, L. L. "The Vectors of Mind," *Psychological Review*, XLI (January, 1934), pp. 1-32.

The author presents a theoretical and statistical discussion of the classification of traits, temperaments, and personalities. Illustrative applications are provided.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

Social-Economic Goals.—In the fall of 1932 a committee was appointed by the N. E. A. to formulate the desirable social-economic goals of America. The January number of the *Journal of the N. E. A.* contains the report of the committee. The ten goals are: (1) hereditary strength, (2) physical security, (3) participation in an evolving culture, (4) an active, flexible personality, (5) suitable occupation, (6) economic security, (7) mental security, (8) equality of opportunity, (9) freedom, and (10) fair play. A second task of the committee is to "indicate the materials and methods which the schools of the nation should use to attain these goals." The six members of the committee are: F. J. Kelly, Office of Education; John Dewey, Columbia University; W. E. Givens, Superintendent of Schools, Oakland, California; E. A. Ross, University of Wisconsin; R. C. Moore, Secretary, Illinois State Teachers Association; and L. C. Marshall, formerly of Johns Hopkins University.

Recent Social Trends.—Former President Hoover's Research Committee on Social Trends has published through the McGraw-Hill Book Co. of New York City a series of significant studies of American life and institutions. Another important survey under the sponsorship of Mr. Hoover, which resulted in a carefully prepared series of published reports, was that of the Whitehouse Conference on Child Health and Protection. The authors and titles of the Social Trends series are:

Women in the Twentieth Century: Their Political, Social, and Economic Activities, by Sophonisba P. Breckinridge.

Rural Social Trends, by Edmund De S. Brunner and J. H. Kolb.

Problems of Education in the United States, by Charles H. Judd.

The Arts in American Life, by Frederick P. Keppel and R. L. Duffus.

The Metropolitan Community, by R. D. McKenzie.

Americans at Play: Recent Trends in Recreation and Leisure Time Activities, by Jesse F. Steiner.

Health and Environment, by Edgar Sydenstricker.

Population Trends in the United States, by Warren S. Thompson and P. K. Whelpton.

Trends in Public Administration, by Leonard D. White.

Communication Agencies and Social Life, by Malcolm M. Willey and Stuart A. Rice.

The Growth of the Federal Government 1915-1932, by Carroll H. Wooddy.

Races and Ethnic Groups in American Life, by T. J. Woofter, Jr.

Publications of the Whitehouse Conference.—The purpose and program of the Whitehouse Conference on Child Health and Protection were outlined in an earlier number of this department.

The breadth of the problems investigated is represented by the titles of the long series of publications now available from the press of Century Co.

Health Protection for the Pre-School Child.
Hospitals and Child Health.
Communicable Disease Control.
Growth and Development of the Child.
Nutrition Service in the Field and Child Health Centers.
Milk Production and Control.
Organization for the Care of Handicapped Children.
Public Health Organization.
Delinquent Child.
Survey of Day Nurseries.
Special Education: The Handicapped and the Gifted.
Nursery Education: A Survey of Day Nurseries, Nursery Schools, and Private Kindergartens.
School Health Program.
Child Labor.
Home and School Coöperation.
Home and the Child: Housing, Furnishing, Management, Income, Clothing.
Pediatric Education.
Pediatrics: Education and Practice.
Obstetric Education.
Body Mechanics.
Education for Home and Family Life.
Psychology and Psychiatry in Pediatrics.
Children's Reading.
Safety Education in Schools.
Social Hygiene in Schools.
Administration of the School Health Program.
Parent Education.
Vocational Guidance.

Emergency Commission. — The Joint Commission on the Emergency in Education was appointed a year ago to aid in dealing with the crisis in education. The Commission, assisted by the headquarters staff of the N.E.A., has been active in disseminating information concerning school conditions through newspapers, periodicals, and radio broadcasts. Regional conferences, attended by members of the Board of Consultants, are being conducted in various parts of the country. Publications issued by the Commission and obtainable from the N.E.A. at Washington are: *Report of the National Conference on the Financing of Education* and *Essentials of Taxation.* The January number of the *Journal of the N.E.A.* contains a more detailed account of the work of the Commission whose personnel is John K. Norton, Chairman, Columbia University; F. Blanche Preble, Chicago Public Schools; Herbert S. Weet, Superintendent of Schools, Rochester; A. L. Threlkeld, Superintendent of Schools, Denver; David E. Weglein, Superintendent of Schools, Baltimore; J. B. Edmonson, University of Michigan; and Sidney B. Hall, State Superintendent of Public Instruction, Virginia.

Survey of Phi Delta Kappa.—The December, 1933, number of the *Phi Delta Kappan,* official organ of the national educational fraternity, Phi Delta Kappa, contains a report of a committee charged with responsibility for a survey of the fraternity. The survey committee consists of N. L. Engelhardt, Columbia University; B. G. Graham, Superintendent of Schools, Pittsburgh; W. W. Patty, Indiana University; C. R. Wise, Assistant Superintendent of Schools, Cleveland; and W. B. Jones, Chairman, University of Pittsburgh. The organization has chapters in forty-two educational institutions and a membership of more than 15,000. Its functions are to promote research, service, and leadership in the field of education. The recommendations of the survey committee deal with the fra-

ternity in terms of functions, financial control, organization, the national office, publications, and projects (investigational and otherwise). At present the organization is coöperating with the Joint Commission on the Emergency in Education in the preparation and printing of a bulletin tentatively entitled, "Evaluating the School Program."

Work of the Progressive Education Association.—The Association has eight committees at work on important educational problems. The areas represented and the committee chairmen are as follows:

Relation of School and College, W. M. Aikin, John Burroughs School, St. Louis.

Social-Economic Problems, G. S. Counts, Columbia University.

Curriculum Research, V. T. Thayer, Ethical Culture School, New York City.

Home and School Relations, Lois H. Meek, Columbia University.

Adult Education, Harold Rugg, Columbia University.

School and Community Relations, Elsie R. Clapp, Ballard Memorial School, Louisville.

Progressive Education in Rural Schools, Allan Hulsizer, Winbrook School, White Plains, New York.

Training of Progressive Teachers, Laura Zirbes, Ohio State University.

Relation between Secondary School and College.—The Commission on the Relation of School and College, appointed by the Progressive Education Association, with Wilford M. Aiken as chairman, has under way a very interesting experiment. Some two hundred colleges have agreed to relax their entrance requirements in accepting students from a carefully selected group of secondary schools, without regard to existing course and unit requirements for college entrance and without examination. Twenty-seven high schools, selected for the experiment, are now at work remaking their programs for future college students, having been given almost complete freedom by the colleges in determining content and method. In 1936 the first graduates from these secondary schools will enter college and five years later the merits of the new plan of admission will be analyzed.

The Carnegie Corporation has given financial support to the experiment. More detailed reports of the plans formulated and the progress made may be found in the November, 1933, *Progressive Education.*

Society for Curriculum Study.—The November 27, 1933, *News Bulletin* (mimeographed) of the Society for Curriculum Study, edited by Henry Harap of Western Reserve University, contains a selected list of courses of study published during 1932-33. The rating of the courses of study was done under the direction of H. B. Bruner of Columbia University. The elementary fields of arithmetic, geography, health and physical education, history, language and grammar, reading, elementary science, and social studies; the junior high school fields of English, home economics, mathematics, music, science, shop, and social science; and the senior high school fields of art, commerce, English, foreign languages, history, home economics, science, and shop are represented, as well as a miscellaneous group at each level.

The Society has at work a committee under the chairmanship of M. E. Herriott charged with the task of preparing a yearly annotated list of new textbooks. Present plans are to include in the first

list not only the publications of 1933, but also of 1932 and 1931. It will be classified by subjects and school levels (elementary, junior high school, senior high school, and junior college).

Integration and the Cincinnati Seminar Plan.—At all levels of instruction there are apparent today sincere attempts to promote integration and synthesis of the instructional program rather than to follow an atomistic type of curriculum which sometimes has been characterized as a "rope of sand." The compartmentalization of subject matter and a policy of practically unrestrained free election in many secondary and higher institutions have left much to be desired by way of coördination and articulation of the work done in a large number of short-unit and diverse courses.

At the elementary level much progress has been made by adopting large units of learning around which may be centered the activity of the so-called school subjects. At the secondary level are found unified or correlated courses in social science, general science, mathematics, and languages. The twenty-seven senior high schools which are coöperating with the Committee on the Relation of School and College, sponsored by the Progressive Education Association, in most instances are working with a curriculum that follows some general "pattern," for example, a horizontal organization which involves culture epochs such as the development of American culture (tenth grade), modern European culture (eleventh grade), and contemporary American culture (twelfth grade). Another plan is vertical in character, carrying through the several high-school years broad fields of knowledge such as fine arts and music, literature and language, social studies, and science and mathematics.

In the colleges the same general objective is involved in: separation of the organization into upper and lower divisions, honors programs, independent study, comprehensive examinations, orientation and synthetic courses, and general reading plans. In the graduate school similar plans are found: Harvard with its two-year program for the Master of Education degree ending in a comprehensive general examination; Yale with graduate work in education centered in a single seminar; and Chicago with a program emphasizing four fundamental areas of instruction in the training of the graduate student in education.

Dean L. A. Pechstein of the Teachers College, University of Cincinnati, announced a seminar program organized tentatively into four sections for the current school year. The four areas represented are: the school in relation to society and the social order, organization of the American school system, educational psychology and principles of learning and teaching, and scientific method and research in education. A faculty chairman is in charge of each of the seminar sections with rather full faculty attendance at each meeting. The seminar program comprises approximately one-half of the load for the full-time Master's candidate of the academic year and is the basis for the Master's examination preliminary to the awarding of the degree. However, summer students and others who do not choose, or are not admitted to, the seminar program may follow the more traditional thirty-hour sequence of shorter-unit courses to the degree.

General Examination for the Ed.M. at Harvard.—The Graduate School of Edu-

cation, Harvard University, has issued an interesting mimeographed booklet describing at some length the General Examination for the degree of Master of Education. The two parts of the examination deal with problems of the candidate's special field and with comprehensive problems drawn from the field of education as a whole. The first part ordinarily requires three hours, while the second part usually occupies two three-hour sessions, although no time limit is fixed for either part of the examination. The examinations consist of several statements describing educational situations to which the student is expected to react critically in terms of a solution.

Dean Holmes' statement concerning the purpose of the examination in relation to the graduate program of training (which includes a group of courses and an apprenticeship requirement) is as follows:

"The Harvard Graduate School of Education endeavors in its two-year program for the degree of Ed.M. to accomplish a genuine professional formation of the student. This involves making sure of his grasp of the subject he is to teach (in the case of a classroom instructor) or of the general background for administrative wisdom (in the case of a school officer); also, of his power of critical, professional insight and constructive thinking on general educational problems; also, of his command over skills and techniques in the job for which he is preparing; and finally, of his grasp of the crucial issues in the field of his own professional practice. In the Comprehensive Paper of the General Examination, which is one of the four final tests for the degree, the Faculty endeavors to get a reliable indication of the student's power to come to wise and fruitful conclusions about educational problems. This particular paper is a test of judgment. The problem is how to set questions which will really give to the student an opportunity to bring into play all the principles and points of view he has acquired. How can questions be set that will distinguish between those who have developed a working professional consciousness and those who have not? In the new form of the examination, an attempt has been made to solve this problem. Further experimentation is under way."

Ohio State Bureau of Educational Research.—The Educational Research Bulletin for November 15, 1933, contains a summary of the work of the Bureau of Educational Research, Ohio State University, during 1932-33. The various divisions of the Bureau (appointments, survey, accomplishment tests, reference, personnel, radio, editorial, and curriculum) are discussed by the staff members in charge. The director, W. W. Charters, in an introductory statement, reviews briefly the major accomplishments as follows:

"The reports from the Divisions of the Bureau when compared with the decennial report of 1932 indicate the trend of investigations and services carried on during the current year. Specifically, expansion has not been easy because of the contraction of the funds of the Bureau. In common with all departments in the University the appropriations have shrunk although the administration in the face of the more insistent claims of instruction has dealt fairly with the Bureau and has made it possible to retain the framework of the organization. That is to say, all essential activities are maintained though with smaller appropriations than usual. For instance, the

Educational Research Bulletin is continued, but it is published monthly rather than fortnightly. The Divisions are intact, but with a smaller personnel and less money for maintenance.

"A heavy load has been placed upon the Appointments Division because of the number of unplaced teachers. Yet as many teachers were placed in 1933 as in 1932 but in smaller schools, on the one hand, and in larger numbers of experienced teachers, on the other. The Survey Division is doing less work upon building programs for obvious reasons, but has done notable work in educational surveys such as the Soldiers' and Sailors' Orphans' Home at Xenia. Assistance has been sought from this division by the Federal Government in its building program in Ohio. The Division of Accomplishment Tests has but slightly expanded its already heavy program carried on for departments of the University and for the national testing program of the American Council of Education.

"The Reference Division with less assistance than in former years has been subjected to a much heavier student-load than in previous years. The increase over 1931-32 was 55 percent. Owing to a national decrease in published materials the acquisitions are somewhat less numerous than last year. The Personnel Division has been extremely busy providing assistance in preparing wage scales, assisting in planning changes arising from contraction in the University, and in a variety of campus services of a technical sort. The Radio Division has during the year completed a survey of all techniques of measuring the radio audiences and has the study in form for early publication. It has carried on a series of studies, notable among which are measures of the influence of radio lessons upon the pronunciation of foreign languages by high-school students and the relative effectiveness of reading and listening over the radio. The Editorial Division carrying on with a depleted staff has published the *Journal of Higher Education* and the *Educational Research Bulletin*, one set of proceedings, and two monographs. Much material awaits printing as soon as times improve. The Curriculum Division has contributed, among other projects, a study on motion-picture appreciation in the form of a textbook to be used in high schools with the objective of teaching adolescents to discriminate between good and poor motion pictures."

Research at Northwestern.—A number of investigations of a coöperative nature have been carried on during the past year by the Division of Research, School of Education, Northwestern University. In connection with advisory relationships which have been maintained with a program of character emphasis in the Kenosha, Wisconsin, public schools three investigations have been undertaken: (1) a study of the character outcomes of the curriculum by teachers employing a special analysis form, (2) the development of a battery of tests of character outcomes, (3) a comparison of deviates in behavior.

In coöperation with the State Department of Public Welfare three researches dealing with the educational aspects of juvenile delinquency have been completed, using the inmates of the three major state institutions for juvenile and youthful offenders as subjects. With the aid of the public schools of Oak Park, Illinois, an investigation of the measurable outcomes of a program of week-day religious training in that city has been completed. A national survey of the religious uses of the radio has been finished

with the coöperation of the National Advisory Council on Radio in Education. A summary of this study is available in the recent publication, *Education on the Air*. Another major study has been made, dealing with the characteristics of pedagogically accelerated children in the high school.

Space is lacking in which to mention all the studies in the field of administration and supervision. Of particular interest during these times are three researches dealing with: (1) a survey of the social welfare work of city schools, (2) changes in the administration of the teaching staff during the depression, and (3) the origin and influence of citizens' committees.

Several studies in teaching methods, measurement, and special problems of learning and teaching have dealt with such problems as: maladjusted pre-school children, the health knowledge and habits of high school girls, techniques in solving arithmetic problems, prediction of success in graduate work, silent reading of college students, development of a fourth-grade reading vocabulary, the measurement of music-reading ability, reading interests and abilities of high school pupils, and a test of music achievement in the intermediate grades.

Among the studies in secondary education the following titles are suggestive: interrelation between college-entrance requirements and high school curriculums, factors which condition the achievement of rural high school pupils, an experimental evaluation of diagnostic teaching in high-school chemistry, and surveys of the pupil populations of three suburban high schools and of one junior high school.

In addition to the student researches mentioned above, members of the faculty have been engaged in a variety of research activities. Seven new volumes have been added to the *Northwestern University Contributions to Education*, four by faculty members, two by students, and one volume devoted to abstracts of forty-five masters' theses in education.

George H. Betts is director of the Division of Research.

Arizona State Department.—Work of a research nature in the Arizona State Department of Education has developed along the lines of three major projects: curriculum reorganization, a testing program, and a general survey of educational conditions and needs in the state.

A complete program of curriculum revision for the elementary schools of the state was begun last year and is in process of completion at this time. A state director of curriculum revision was appointed, who in turn organized committees to work out a course in each field of study. Courses are being prepared in the following fields: agriculture, Americanization, arithmetic, art, character education, language arts (handwriting, spelling, composition, and grammar), social studies (geography, history, civics), home making, industrial arts, music, natural science, physical education (including health education), and reading. A general bulletin which contains an analysis of the elementary-school situation in Arizona and the aims and guiding principles of elementary education was sent to every teacher in the state. Installation of the curriculum will take place on completion of the entire series.

The state-wide program of achievement tests being carried on by the Department already has shown some marked tendencies in the teaching of certain subjects in Arizona schools. The pro-

gram, by November 1, had covered some six counties and had been received with apparent pleasure and good will in all these counties, with invitations from most of the remaining counties of the state to administer the tests. The tests are given in reading, spelling, language usage, and arithmetic. The general tendencies in the six counties, with individual schools excepted of course, show a distinct weakness in the first three subjects and a marked strength in arithmetical computation. The difference in attainment in the two groups varies from four or five months in one county to more than a year in certain other instances.

While no definite proof as yet has been found, it is the feeling of those in charge of the program that the results of these tests point to weaknesses in class-room schedules, teaching methods, textbooks, and administrative attitudes. After this first survey of the state, it is expected that the program may be confined to an eighth-grade and high-school comprehensive examination and to a survey of one subject annually in grades three to seven inclusive. Details of the program are being worked out by the staff of the state superintendent of public instruction.

A general survey of the state is being conducted by a Fact-Finding Committee of which Governor B. B. Moeur and State Superintendent H. E. Hendrix are members. The additional members of the committee will include seven business men and six school people from different parts of the state. The members of the Fact-Finding Committee will arrange such questionnaires, checking lists, and requests for information as seem advisable. This information will be accumulated, tabulated, and arranged for presentation by the Arizona State Department of Education. The committee will use the information in recommending expedient changes in the school organization of the state. A continuation of this work will be possible through a ten-year planning commission. This commission will be organized when the Fact-Finding Committee has completed its work.

The director of research for the State Department is W. H. Harless.

Pupil Progress in Texas.—A bulletin, *The Progress of Pupils in the State of Texas*, 1932-1933, prepared by Fred C. Ayer for the Section of Superintendence of the Texas State Teachers Association, traces over a three-year period the progress of pupils who entered the public schools of Texas in the fall of 1929-30. The conclusions indicate that large numbers of pupils are over-age for their grades and make slow progress, with extreme variations in age and progress among pupils in the same grade, although age-grade conditions are improving due to earlier entrance into the first grade. Size of city has little or no influence upon rate of progress, but conditions are less favorable in rural than in city districts. Children entering school at six years of age make slightly better progress in the first three grades than those entering at seven, while five and eight year old entrants are slower than either six or seven year olds. General progress and age conditions are decidedly less favorable among Mexican and Negro pupils than among non-Mexican white pupils, although under favorable school conditions the age-grade status of negro children is but little below that of white pupils.

Australian Research.—In order to keep teachers fully informed of the activities of the Australian Council for Educational Research and to bring to

their attention interesting investigations and developments in various parts of the world, the Council is issuing a monthly series of news notes (mimeographed).

The Council was established in April, 1930, as the result of an endowment from the Carnegie Corporation of New York. The Council consists of nine members who have full control of its policy, activities, and finances. Six of these members are elected as representatives of state institutes for educational research. The interests of the Council extend over all levels of education and include all educational institutions, whether under state or private control.

In addition to acting as a center for research and information, it makes grants to qualified investigators. Up to the present, 102 such applications have been approved, the total value of the grants being approximately 9,215 pounds. In the investigations thus set on foot all States are represented as well as all stages of education from nursery-school to university.

The Council publishes in an Educational Research Series the most valuable of the reports submitted to it either by its own or by independent investigators. These reports are printed by the Melbourne University Press and may be procured either from the Press, from the headquarters of the Council, or from booksellers. The monthly mimeographed bulletin of the Council summarizes briefly the contents of these studies, the titles of which are as follows:

No. 1, C. Fenner and A. G. Paull, *Individual Education.*

No. 2, K. S. Cunningham and G. E. Phillips, *Some Aspects of Education in the United States of America.*

No. 3, K. S. Cunningham, *Primary Education by Correspondence.*

No. 4, D. D. Copland, *Training for Business.*

No. 5, H. L. Fowler, *Induction or Deduction.*

No. 6, H. L. Fowler, *The Young Child.*

No. 7, R. W. Stanhope, *The Teaching of Chemistry in the Secondary Schools of New South Wales.*

No. 8, G. S. Browne, *The Case for Curriculum Revision.*

No. 9, H. S. Wyndham, *Class Grouping in the Primary School.*

No. 10, G. R. Giles and J. R. Lyall, *Occupations in Victoria.*

No. 11, Nora M. Hales, *An Advanced Test of General Intelligence.*

No. 12, Nora M. Hales, *The Growing Child.*

No. 13, D. C. Griffiths, *The Psychology of Literary Appreciation.*

No. 14, *Australian Educational Studies (First Series).*

Studies under way deal with: physical and mental condition of school children living under tropical conditions in Central Queensland, relative advantages of various methods of presenting subject matter to classes of school children, basis of ability to spell and the causes of spelling disability, delinquency, construction of a standardized test in physics, class size and efficiency of instruction, and reliability of examination forecasts.

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(4) It is highly desirable that test results and subjective ratings be combined to insure fairness in awarding scholarships. The test (a) obviates the difficulty of keeping the performance of different players in mind while listening to subsequent candidates; (b) it is not influenced by the personality of the performer; and (c) the playing of different pieces by different students does not complicate the comparison.

(5) Through the use of specially designed charts, a direct comparison can be made of the scores of different children, irrespective of age.

(6) The test is very useful in research to determine the interrelationship between mental abilities, to study racial differences, and to clarify some of the problems in esthetics.

(7) The test is adapted for use with any kind of group, of any age from eight years or above, with or without musical training.

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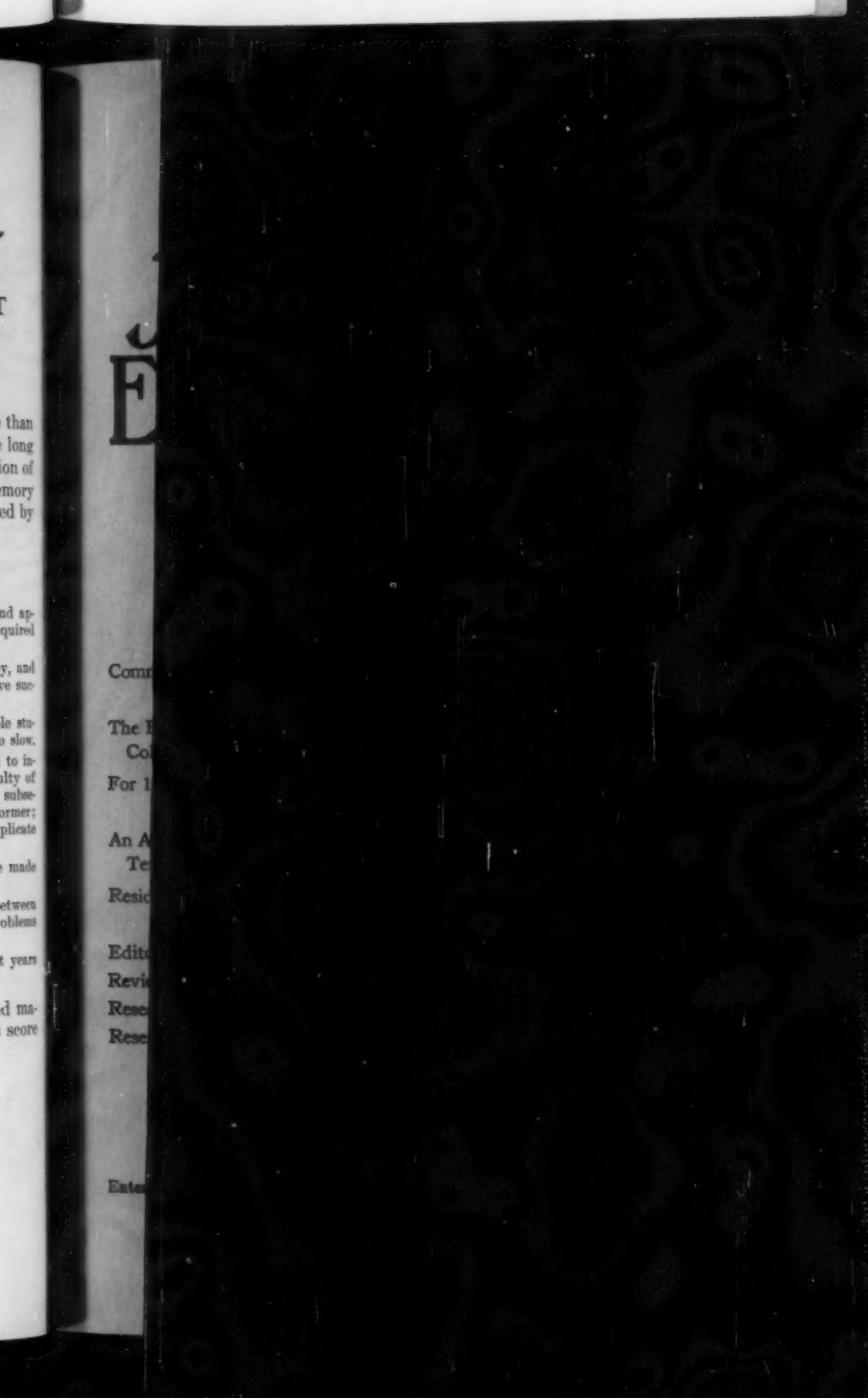
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